

## **APPENDIX G**

### **City of Redding Storm Drain Utility Operations and Maintenance Plan**

**DRAFT  
STORM DRAIN UTILITY  
MAINTENANCE AND OPERATIONS PLAN**



**REDDING MUNICIPAL UTILITIES  
MARCH 2003**

# Maintenance and Operations Plan

## Preface

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To prevent flooding and to protect life and property, the City has accepted or incurred certain obligations related to control of storm waters. As a result of regulations, the role has been expanding to better protect water quality and to deal with plan and species issues.

This document, a Maintenance and Operations Plan (Plan) for the Storm Drain Utility, relates to three other documents of the City and various permits issued to the City for storm drain and stream channel maintenance. Incorporated herein by reference are the following:

- Redding Municipal Code
- Storm Drain Master Plan, as amended
- Storm Water Quality Improvement Plan

This Plan outlines activities which relate to the Storm Drain Utility enacted within the City of Redding in September 1993. The Utility was formed following the completion of a City-Wide Master Storm Drain Study which defined capital improvement needs and projected costs within the City and also provided an estimate of impacts as a result of development. One of the Study recommendations enacted by the City Council, was the creation of the Storm Drain Utility (Utility). The formation of the Utility was to provide an adequate funding source for:

- ▶ Storm drain maintenance;
- ▶ Street sweeping;

- ▶ Future water quality requirements under the pending Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) program; and
- ▶ Capital improvements needed to upgrade existing facilities identified in the Master Storm Drain Study.

Since the formation of the Utility, maintenance activities have been conducted utilizing an on-demand methodology, whereby the cleaning of ditches, catch basins and channels is done when a blockage problem is observed or called in by the public at large. Activities contained within the maintenance program in 1993 have been modified to reflect current funding levels.

As federal regulations related to NPDES become required on small urban areas, it is necessary to further define the activities, costs, and revenues related to maintenance and operations. To that end, this Plan has been developed to provide guidance with measurable goals for maintenance personnel, to define the various facilities within the City to be maintained, to provide information to the regulatory agencies who overview maintenance within storm water channels, to obtain necessary permits, and to provide cost estimates managers and planners can utilize in the management of the Utility.

This Plan is divided into the following eight sections:

1. Introduction
2. Facility Types

3. Existing Facilities Inventory and Maintenance
4. Regulatory Permits
5. Operational Goals and Objectives
6. Recommended Maintenance Practices
7. Financial Issues
8. Summary of Maintenance and Operations Recommendations

Contained within these sections is information related to pending NPDES Phase II requirements as they relate to maintenance; essential and regulatory issues and needs; suggested way to be more efficient through the use of existing programs operated by others and/or the transfer of tasks to reduce duplication; projected growth in facilities through the year 2023; financial forecasts; discussion of capital improvements and the need to develop and maintain capital improvement programs; and, operation and maintenance funding operations and recommendations.

Essentially, this is a combination management audit and work plan for the Storm Drain Utility to prepare the Utility for the next ten years. Without significant changes, the Utility is subject to failure and inability to meet maintenance obligations.

This is not intended to be a static document. It is intended to be a working document for the community on meeting needs and mandates related to storm water runoff and pollution prevention. To the extent there are issues, this is also a problem statement on dealing with a complex issue by the community.

# Maintenance and Operations Plan

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# Maintenance and Operations Plan

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# Section I

## Introduction

In July 1993, a City-Wide Master Storm Drain Study (Study) was completed and recommended that the City pursue the formation of a Storm Drain Utility. The goal of formation of this utility was to provide an adequate funding source for storm drain maintenance, street sweeping, future water quality requirements under the pending Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) program, and capital improvements needed to upgrade existing facilities identified in the Master Storm Drain Study. In October 1993, the Storm Drain Utility was established by adoption of Ordinance No. 2061 (See Appendix A) by the Redding City Council.

Today, as the Storm Drain Utility (Utility) begins to address non-point source pollution and water quality issues, while complying with more stringent permitting processes required by wildlife and wetland regulatory agencies and a constrained financial forecast, it is critical to the Utility's overall success that a comprehensive maintenance plan be in place.

### A. PURPOSE

The goal of the storm water maintenance and operations plan is to outline a program for efficient, cost-effective and environmentally responsible maintenance of the City's storm water infrastructure.

Foremost in the development of these guidelines was compliance with Federal and State laws; protection of the lives and property of City residents from flooding; to effectively enhance water quality; and, to preserve the City's natural wetlands and riparian habitat.

The primary objectives of the plan are:

- To complete a comprehensive facilities inventory of the system.
- To develop operating procedures.
- To establish overall policies and levels of service.
- To develop a detailed activity reporting system.
- To establish a 10-year financial plan.

It is important to note that no maintenance plan is ever "complete." This plan will continue to evolve as regulations change, facilities increase, and standards/costs are further refined. The plan will let the public and decision makers know what the City can accomplish with the funds available, what the priorities are, and what cannot be done without further funds or support.

### B. HISTORIC MAINTENANCE LEVELS

#### *Prior to the Storm Drain Utility*

At the time of the 1993 Study, the City's Streets Division had three, four-man crews dedicated to streets and storm drain maintenance. Each crew consisted of (1) working supervisor, (1) a heavy equipment operator and (2) maintenance workers. The City was divided into three quadrants with one crew assigned to each quadrant. Each crew was responsible for performing all maintenance work associated with roadways, pavement markings and striping, curbs, gutter, sidewalks and the existing drainage system within their specific quadrant.

## Section 1 – Introduction

The crews approached storm drain maintenance by surveying the system each year, prioritizing system cleaning and clearing, and addressing the highest priority sections of the system first. The overall volumes of both the street and storm drain maintenance, as well as, budget limitations prevented the Streets Division from doing much more than respond to customer needs and meet minimal maintenance levels. There were no funds for system repair and replacement.

The 1993 Study found that the Streets Division personnel were maintaining the facilities at the following levels:

- 15 miles of open drainage channels were inspected annually with about five miles being cleaned each year;
- 114 miles of storm drain pipes were inspected annually. Cleaning was performed only at areas where problems were noted; and
- Catch basins/inlets were cleaned on an "as needed/emergency" basis only. Maintenance was very labor intensive, as staff did not have access to a vacuum truck.

In 1993, street sweeping was not performed by the Streets Division staff. This activity was under the Sewer Division and accomplished by (2) full-time street sweeper operators utilizing two street sweepers. The result of their performance was as follows:

- Residential streets were being swept once every two weeks, arterial streets once per week, and commercial areas three times per week. There were 511 curb miles and an 80% completion rate was maintained.

### *Storm Drain Utility – First Year Review*

The goal of establishing the Storm Drain Utility was to result in a funding mechanism for daily operations, capital improvements, and for the anticipated NPDES program mandate.

In 1994, many of the Study's recommendations for maintenance levels, equipment purchases and/or replacements, and staffing were implemented. Initial purchases included a new street sweeper and VacCon (vacuum) truck. Storm drain maintenance activities and the street sweeping operations were combined to form one operating utility. Staffing consisted of six full time positions – (1) working supervisor, (1) a heavy equipment operator, (2) maintenance men, and (2) street sweepers.

First year maintenance level results were as follows:

- Of the 15 miles of open drainage channels – 100% were inspected and 50% were cleaned;
- Of the 5,041 catch basins/inlets – 40% were cleaned and inspected;
- 531 curb miles were swept at a frequency of once per month for residential streets and once per week for commercial areas – 90% completion rate; and
- 129 miles of storm drain pipes were scheduled for inspection and cleaning – 5% were inspected and cleaned.

This first year review also revealed that the storm drain service charge, initiated with the establishment of the Utility, was inadequate to fund all aspects of storm water maintenance. (See Section 7 for the service charge formula, rates, annual revenue, etc.) Also, the Storm

## Section 1 – Introduction

Drain Utility personnel were unable to achieve and/or maintain the maintenance frequencies and performance levels desired. This was due in part to the increasing number of facilities, the need for additional equipment, preparation for transition to the new Corporation Yard increased travel times, and new procedures for material disposal.

As a result of public controversy and to keep customer rates as low as possible, the City Council decided not to increase fees. Because of the funding shortfall, the Utility found it necessary to reduce manpower, reduce service levels and forego identified capital improvements.

### *Storm Drain Utility – 2001/02*

In response to demands by regulatory agencies and in anticipation of NPDES requirements being applied to the City in 2003, the City conducted a comprehensive review of Storm Drain Utility operations in 2002. Information was collected through interviews with the Utility staff and records maintained on the facilities, maintenance frequencies, field surveys, crew configurations, equipment and repair/replacement needs. This review revealed that due to budget constraints over the years, personnel decreased, maintenance frequencies had been pared down, activity and facility reporting records had not been updated, and there was no funding available for repair and replacement of existing facilities that are undersized or failing. Also noted, was the ongoing increase in the number of new facilities due to development and the added burden of the pending NPDES requirements beginning in March 2003.

The following provides a brief summary of the current program.

- Administration of the Utility is handled by a Public Works Manager and a Public Works Supervisor. They each spend approximately 25% to 30% of their time overseeing operations, budget, report preparation, special projects, etc., for the Utility.
- There are currently five full-time employees budgeted to the Utility – (1) working supervisor, (1) a heavy equipment operator, (2) maintenance men, and (1) a street sweeper.
- Most maintenance work is performed by a working supervisor and a two-person crew unless the type, location, or magnitude of the project requires additional assistance.
- The 18 miles of identified open drainage channels/ditches are inspected annually. City crews accomplish cleaning of the channels based on the type of maintenance permitted within that section, as previously determined by the Department of Fish and Game. City crews, with the assistance of the California Conservation Corps crews, clean approximately 50% of these channels/ditches annually.
- There are 5,220 catch basins/inlets and maintenance addresses 20% per year.
- The 129 miles of storm drain pipes are maintained on an “as needed” basis with about 20% being inspected annually.
- The 570 curb miles are swept by one street sweeper. Residential streets are swept six times per year while commercial arteries are swept weekly.

In summary, the Utility continues to face all of the challenges that existed at the time the

## Section 1 – Introduction

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Utility was formed. These challenges are compounded by increasing infrastructure and implementation of NPDES requirements as a result of growth of and new regulations.

## Section 2

### Facility Types

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This section defines in general terms the types of facilities that are constructed and maintained as part of the City's overall storm water system. Recommended maintenance activities for these facilities are outlined in Section 6.

#### A. CULVERTS/PIPES

A culvert is a relatively short section of pipe or concrete box usually designed to convey flow under or away from a roadway. Because of its semi-open nature, it is prone to blockages from vegetation, trash, and other debris in addition to sediment.

Pipes are longer than culverts and more likely to be deeper underground and located in areas such as backyards and longitudinally under roadways where access is difficult. Typically, pipes are constructed of concrete or plastic. However, past practice included corrugated metal pipe which has a shorter expected design life span.

#### B. CATCH BASINS/INLETS

Catch basins are inlets at the curb, several feet deep, which allow the transition of surface drainage to the storm drain pipe. Catch basins can also act as a junction structure allowing multiple inlet pipes and surface drainage to merge into a single, sometimes larger, outlet pipe.

#### C. NATURAL STREAM CHANNELS

In the Redding area, natural stream flows are a result of rainfall and some seasonal springs. The rainfall follows the slope of the earth down to a natural swale where the water collects to form a stream channel. These

stream channels descend geographically, merging with other channels, and develop into larger streams. While these stream channels typically follow nature's path, most will pass through some sort of man-made culvert or pipe system before reaching the river.

#### D. OPEN CHANNELS

Open channels primarily convey storm water flows. These channels also descend geographically and are the main source of channelization for conveying storm water to the Sacramento River. Many of these channels are natural drainage courses, however, some are intentionally constructed or re-shaped by newer development for storm water flows and/or to maintain their soil lining.

#### E. EARTHEN DITCHES

Ditches are defined as long, narrow excavations dug in the earth for the purpose of channeling storm water. These may be man-made, typically constructed by excavation to a grade, and maintain their earthen lining.

#### F. CONCRETE CHANNELS

These types of channels are basically defined as an open channel with improvements. Typically, the improvements include concrete bottoms, and possibly vertical or sloping concrete sides.

#### G. ROADSIDE DITCHES

Roadside ditches are a low-lying stretch of land constructed for the purpose of conveying storm water runoff adjacent to roadways. These roadside ditches are located along certain portions of arterial/collector streets

## Section 2 – Facility Types

and throughout older and more rural residential development. In many cases, these roadside ditches are left in a natural grassy swale type condition and some have incorporated corrugated pipe to enter and exit private properties. In rural open canyon areas, cobble lining is utilized in steep areas to reduce erosion.

### H. DETENTION/RETENTION BASINS

Basins provide temporary storage for storm water, which allows sediment and pollutants to settle out of the water to the bottom of the pond. Generally speaking ponds are designed and/or utilized to hold back flood waters and release it slowly to streams during peak storm events. They are also installed for water quality benefits. The effectiveness of a pond is based on its ability to hold a certain amount of water, or design volume, for a calculated period of time to minimize flooding downstream.

### I. STREETS, CURBS, AND GUTTERS

Pollution prevention and good housekeeping for Municipal Operations are one of the six minimum measures that must be addressed in Phase II of the NPDES requirements. Ideally, it is best to keep debris and pollutants from entering the storm water system in the first place. However, since that is not always possible, street sweeping is considered a drainage management service and is performed to meet these goals:

- Remove street dirt, debris and other hazards for health, safety and appearance.
- Protect air quality through road dust removal.

- Remove street debris and sediments which tend to block flow and cause flooding.
- Protect public investment in transportation facilities from damage.
- Protect water quality by removing excess debris and pollutant-carrying sediments before they reach streams.

## Section 3

# Existing Facilities Inventory and Maintenance Levels

### A. EXISTING FACILITIES

The following table summarizes the storm drainage system inventory. The table shows the facilities identified in January 2002 and the updated findings of the ongoing comprehensive inventory through December 2002. The January 2002 information was based on quantities provided by field crews

and GIS data derived from the existing storm drain atlas books. The December 2002 inventory quantities are a result of an extensive city-wide field review conducted by the Utility staff. Implementation of the detailed inventory procedures identified in this Plan will enable Utility staff to maintain an up-to-date record of the storm drain infrastructure.

**Table 3 - 1**  
**Facility Inventory Summary**

Maintenance Item	January 2002 Quantities	December 2002 Quantities	Unit Measurement
Culverts/Pipes (1)	681,120	727,673	Feet
Catch Basins/Inlet Structures	5,220	5,220	Each
Earthen Ditches (2)	79,200	360,320	Feet
Natural Stream Channels		171,027	Feet
Open Channels		242,799	Feet
Concrete Channels		61,626	Feet
Roadside Ditches (3)	N/A	N/A	Feet
Detention Basins	3	48	Each
Street Sweeping	537	570	Curb Miles

**Notes:**

- Generally, drainage pipes do not require regular maintenance, however, a thorough inspection and rating of all pipes will be conducted as a part of this plan and repeated every five years.
- The inventory quantities available in January 2002 did not clearly delineate between natural stream channels, open channels, earthen ditches, concrete channels, and/or roadside ditches. Additionally, the January 2002 quantity shown only identifies that portion which was being maintained by the City.
- Inventory of the roadside ditches is scheduled to be completed in 2003/04.

## Section 3 – Existing Facilities Inventory and Maintenance Levels

### B. CURRENT MAINTENANCE PRACTICES

Current maintenance practices for the above-referenced facilities consist of the following types of activities.

#### *Culverts/Pipes*

Drainage pipes do not require regular maintenance. Most cleaning and/or repair to culverts and pipes are done in response to flooding complaints. Clogging or blockages are usually caused by trash or sediment accumulation, entry of tree roots, and collapse or poor alignment of the pipe.

#### *Catch Basins/Inlets*

These facilities are maintained on an "as needed" or "time permitting" basis. The task usually involves the removal of sediment, trash and debris. Depending on the size and type of debris, the removal is either done by hand or operation of the vacuum truck. Under current maintenance procedures only 20% are inspected/cleaned annually.

#### *Ditches/Channels*

The Utility currently inspects identified ditches/channels annually. Maintenance of earthen ditches, natural stream channels and storm water channels is performed based on some previously defined "ditch type" criteria established in 1996 by the local Department of Fish and Game.

Ditch type "A" is cleaned only at the inlet/outlet of the culvert, 50 feet plus/minus upstream and downstream. A backhoe or other equipment is satisfactory as long as operated from the top of the ditch bank.

Ditch type "B" is cleaned only to maintain flow of water. This task is accomplished by placing a backhoe, dozer or similar equipment into the ditch.

Ditch type "C" is also cleaned to maintain flow of water. However, these ditches may only be cleaned by hand and the banks are to be left undisturbed. Work is usually accomplished by California Conservation Corps or juvenile offenders working under the Crystal Creek Conservation Camp work program. These channels are of concern to regulatory agencies for impacts on endangered plants or species.

Maintenance activities include, cleaning, reshaping, sediment removal, vegetation control and erosion prevention. In addition to handwork, certain activities require equipment such as a backhoe, mucker, track loader and various types of trucks. Fifty percent of the channels are cleaned on even years with the other half being cleaned on odd years.

#### *Detention/Retention Basins*

While an inventory of the basins has not yet been completed, of the basins that have been identified, maintenance practices currently include clean up of trash, debris and weed abatement. To date, only three basins are maintained. Work is done by hand, usually performed by the juveniles from the Crystal Creek work program, and the work is monitored by a City Utility supervisor.

#### *Street Sweeping*

The City's 537 curb miles are swept by one employee alternating between two sweepers. Only those City streets with curb and gutter are swept. Streets identified as commercial arteries are swept weekly while residential streets are swept six times per year. The driver makes multiple trips to the Transfer Station daily to dump debris. During a peak leaf season, the sweeper dumps loads at various locations throughout the City which are picked up by the Utility crews and transferred to the landfill by dump trucks.



## Section 4

# Regulatory Permits

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This section of the Plan identifies current regulatory permits required to perform routine and annual storm water channel maintenance.

### A. PERMIT HISTORY

Through the years, the City of Redding has complied with the permitting process required by the Department of Fish and Game for channel maintenance. The last permit was entered into in 1996 in the form of a Memorandum of Understanding (MOU) and addressed maintenance for certain watercourses, natural streams, drainages and flood control projects and facilities. The annual fee for this permit was \$662 and had a term of five years. Upon expiration of the MOU in December 2001, the City learned of new Federal/State mandates that have resulted in a more stringent permitting process required by the wildlife and wetland regulatory agencies. The new process has prompted the City to more closely address its' storm drain maintenance and operation. The effect of this new requirement is that the City may have to utilize more expensive maintenance practices in core areas (hand work) or drop sensitive channels from maintenance.

### B. DEPARTMENT OF FISH AND GAME

The Department of Fish and Game (DFG) is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the law requires any person, state or local government agency, or public utility proposing a project that may impact a river, stream, or

lake to notify the Department before beginning the project. If the DFG determines that the project may adversely affect existing fish and wildlife resources, a Lake or Streambed Alteration Agreement is required.

Under Fish and Game Code Section 1601, before any local governmental agency begins a construction project that will:

- Divert, obstruct, or change the natural flow or the bed, channel or bank of any river, stream, or lake;
- Use material from a streambed; or
- Result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavements where it can pass into any river, stream, or lake;

The agency must first notify the DFG of the proposed project. The notification requirement applies to any work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel.

To achieve a new Agreement or, in the City's case, obtain a new Memorandum of Understanding (MOU), the City must complete the following items:

1. A completed Notification of Lake or Streambed Alteration form (FG2023). The form requires (1) a map of the project location, (2) a project description, (3) construction plans and drawings, (4) California Environmental Quality Act (CEQA) documentation when applicable, and (5) copies of any local, State, Federal or other required permits/authorizations.
2. Completion of a Project Questionnaire

## Section 4 – Regulatory Permits

form (FG2024)

3. The appropriate application fee as specified in the current fee schedule.

Upon receipt of the Notification documents, DFG has a minimum of 30 days to determine if our Notification is complete. Once a determination is made, the City will be notified and, if an Agreement is required, a list of steps will be provided for the City to follow in protecting the resources. CEQA determination will also be reviewed at this time. After the City has completed all related legal requirements and the Agreement has been executed by both DFG and the City, we may begin our project.

This Agreement, per Section 1601(f) of the Fish and Game Code, is automatically renewed by DFG when it expires unless DFG determines that "there has been a substantial change in conditions." If conditions have not significantly changed, the Agreement will be renewed upon payment of any applicable fees. If DFG determines that substantial changes have occurred, an amended Agreement accounting for the changed conditions will be required along with CEQA compliance before a renewal will be granted.

Fish and Game Code Section 1601(f) also clarifies that the City does not need to acquire a Lake or Streambed Alteration Agreement before commencing the following types of emergency work:

- Immediate emergency work necessary to protect life or property.
- Immediate emergency repairs to public service facilities under specified circumstances.
- Emergency projects undertaken, carried out, or approved by a public agency to maintain, repair, or restore an existing

highway, as defined, within the existing right-of-way of the highway, damaged as a result of fire, flood, storm, earthquake, land subsidence, gradual earth movement, or landslide, within one year of the damage.

While pre-notification is not required for the work described above, the City must notify DFG in writing of the emergency work within 14 days after the work begins.

### C. U. S. ARMY CORPS OF ENGINEERS

The U.S. Army Corps of Engineers (Corps) has been regulating activities in the Nation's waters since 1899, to protect its navigable capacity. Since the 1960s, the regulatory program's aim was expanded by Congress to consider the full public interest in protecting and using water resources, environmental impacts, and commercial benefits. In 1972, Section 404 of the Clean Water Act was passed. It prohibits discharging dredged or fill material in U.S. water without a permit from the Corps. Court rules and litigation further defined "water of the U.S." to include virtually all wetlands. Because the definition of "discharge of dredged material" was modified in August 1993, activities that impact waters, including wetland, will usually require a Corps permit.

Waters of the U.S. specifically refer to:

1. All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All other water such as intrastate lakes, rivers, streams (including intermittent streams) mudflats, sand flats, "wetlands,"

## Section 4 – Regulatory Permits

sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds where the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

- a. Which are or could be used by interstate or foreign travelers for recreational or other purposes;
  - b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
  - c. Which are used or could be used for industrial purposes by industries in interstate commerce;
3. All impoundments of waters otherwise defined as waters of the United States under this definition;
  4. Tributaries of waters identified in paragraphs (1) through (4) of this definition;
  5. The territorial sea; and
  6. "Wetlands" adjacent to water (other than waters that are themselves wetlands) identified in paragraphs (1) through (6) of this definition.

The U.S. Army Corps of Engineers defines numerous Nationwide Permits for various activities associated with storm drainage systems. Four such permits apply to storm drain maintenance facilities:

### *NWP - 7 Outfall Structures Maintenance*

Activities related to:

1. Construction of outfall structures and

associated intake structures where the effluents from the outfall are authorized, conditionally authorized, or specifically exempted, or are otherwise in compliance with regulations issued under the national Pollutant Discharge Elimination System (NPDES) Program.

2. Maintenance excavation, including dredging, to remove accumulated sediments blocking or restricting outfall and intake structures, accumulated sediments from small impoundments associated with outfall and intake structures, and accumulated sediments from canals associated with outfall and intake structures, provided that the activity meets all of the following criteria.
  - a. The permittee notifies the District Engineer.
  - b. The amount of excavated or dredged material must be the minimum necessary to restore the out falls, intakes, small impoundments, and canals to original design capacities and design configurations (i.e., depth and width);
  - c. The excavated or dredged material is deposited and retained at an upland site, unless otherwise approved by the district Engineer under separate authorization; and
  - d. Proper soil erosion and sediment control measures are used to minimize reentry of sediments into waters of the U.S.

The notification portion of this permit also requires submission of information regarding the original design capacities and configurations of the facility and identification of the presence of special aquatic sites (e.g. vegetated shallows) in the vicinity of the proposed work.

## Section 4 – Regulatory Permits

### ***NWP - 31 Maintenance of Existing Flood Control Facilities***

This permit covers discharge of dredge or fill material resulting from activities associated with the maintenance of existing flood control facilities, including debris basins, retention/detention basins, and channels that were previously authorized by the Corps by Individual Permit, General Permit, by 33 CFR 330.3, or did not require a permit at the time it was constructed.

This permit requires physical characteristics of the facility be submitted and approved by a Corps District Engineer to establish a maintenance baseline for the facility. The required documentation includes as-built drawings and the supporting documentation of the design capacities of the flood control facility. Such documentation needs to include BMP's to ensure that the impacts of the aquatic environment are minimal.

This permit does not authorize maintenance of a flood control facility that has been abandoned. A flood control facility will be considered abandoned if it has operated at a significantly reduced capacity without needed maintenance being accomplished in a timely manner.

In emergency situations, this NWP may be used to authorize maintenance activities in flood control facility for which no maintenance baseline has been approved. Emergency situations are those which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if action is not taken before a maintenance baseline can be approved. This exception requires mitigation of the impacts of the emergency maintenance be completed following the emergency.

### ***NWP - 41 Reshaping Existing Drainage Ditches***

Discharges of dredged or fill material into non-tidal waters of the U.S., excluding non-tidal wetlands adjacent to tidal waters, to modify the cross-sectional configuration of currently serviceable drainage ditches constructed in waters of the U.S. The reshaping of the ditch cannot increase drainage capacity beyond the original design capacity. Nor can it expand the area drained by the ditch as originally designed.

Essentially, this permit allows changing of channel configurations only for the purpose of wetland enhancement projects. Any increase in a wetland habitat within a ditch designated as a storm water conveyance facility impedes the ability to perform required channel maintenance assuring health and safety of the public and protection of property from flood damages.

### ***NWP - 43 Storm Water Management Facilities***

This permit cover discharges of dredged or fill material into non-tidal waters of the U.S., excluding non-tidal wetlands adjacent to tidal waters, for the construction and maintenance of storm water management facilities, including activities for the excavation of storm water ponds/facilities, detention basins, and retention basins; the installation of maintenance of water control structures, outfall structures and emergency spillways; and the maintenance dredging of existing storm water management ponds/facilities and detention and retention basins, provided the activity meets all of the following criteria.

1. The discharge for the construction of new storm water management facilities does not cause the loss of greater than 1/2-

## Section 4 – Regulatory Permits

- acre of non-tidal waters of the U.S., excluding non-tidal wetlands adjacent to tidal waters.
2. The discharge does not cause the loss of greater than 300 linear-feet of a stream bed, unless for intermittent stream beds this criterion is waived in writing pursuant to a determination by the District Engineer, as specified below, that the project complies with all terms and conditions of this NWP and that any adverse impacts of the project on the aquatic environment are minimal, both individually and cumulatively;
  3. For discharges causing the loss of greater than 300 linear feet of intermittent stream beds, the permittee notifies the District Engineer. In such cases, to be authorized the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine the adverse environmental effects are minimal both individually and cumulatively, and then waive this limitation in writing before the permittee may proceed;
  4. The discharges of dredged or fill material for the construction of new storm water management facilities in perennial streams is not authorized;
  5. For discharges or excavation for the construction of new storm water management facilities or for the maintenance of existing storm water management facilities causing the loss of greater than 1/10-acre of non-tidal waters, excluding non-tidal wetlands adjacent to tidal waters, provided the permittee notifies the District Engineer. Notification must include:
    - a. A maintenance plan. The maintenance plan should be in accordance with state and local requirements, if any such requirements exist.
    - b. For discharges in special aquatic sites, including wetlands and submerged aquatic vegetation, the notification must include a delineation of the affected areas.
    - c. A compensatory mitigation proposal that offsets the loss of waters of the U.S. Maintenance in constructed areas and not within compensatory mitigation areas.
  6. The permittee must minimize discharges into waters of the U.S. at the project site to the maximum extent practicable, and notification must include a written statement to District Engineer detailing compliance with this condition;
  7. The storm water management facility must be designed using BMP's and watershed protection techniques.
  8. Maintenance excavation will be in accordance with an approved maintenance plan and will not exceed the original contours of the facility as approved and constructed; and
  9. The discharge is part of a single and complete project.
- To maintain channel capacity, and thereby consistent flood plain elevations, many of the City of Redding waterways require occasional maintenance activities to remove sediment and/or excessive vegetation from channels or culverts. Removal of accumulated sediment and/or vegetation from waters of the U.S. (As defined by the Corps of Engineers) requires permission from the Corps in the form of one of the described permits. Explanation of the

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nature and extent of the maintenance required to maintain the existing flood plain level is one of the goals of this document. The Storm Drain utility is the entity performing this maintenance. The permit process will require substantial record keeping and likely include an increase in frequency of channel maintenance to prevent the accumulation of excessive vegetation creating jurisdictional wetlands with negative impacts on conveyance and flood plain elevations.

### D. STATE WATER QUALITY CONTROL BOARD

Under Federal law (Clean Water Act) every applicant for a Federal permit or license for an activity which may result in a discharge into a water body must request State certification that the proposed activity will not violate State and Federal water quality standards. This certification process is managed by the State Water Quality Control Board Regional office. Each Regional Water Quality Control Board establishes water quality standards that specify:

1. The designated beneficial uses of the waters, e.g., drinking water, agriculture, recreation, fish and wildlife habitat.
2. Water Quality Objectives. Water quality objectives are numeric and narrative limits or bans on specific water characteristics that support the designated beneficial uses.
3. A state-specific Anti-degradation Policy. An anti-degradation policy is a specification that no activities will degrade the existing water quality.

Any project that requires an Army Corps of Engineers Section 404 permit also requires a Water Quality Certification issued by the

local Regional Water Quality Control Board.

Submission of a Water Quality Certification application requires:

1. A \$500.00 procession fee;
2. A detailed description of the project site;
3. Evaluation of the potential impacts of the project;
4. Identification of the BMP's being implement in association with the project;
5. Identification of the type of CEQA document used;
6. Other permits associated with the project; and
7. History of projects carried out by the applicant within the previous five years.

### E. U.S. ENVIRONMENTAL PROTECTION AGENCY

#### *U.S. EPA Clean Water Act Requirements*

On December 8, 1999 the federal government as part of the Clean Water Act issued final regulations for storm water management in smaller communities - known as the National Pollutant Discharge Elimination System (NPDES) Phase II Rule. The City of Redding was listed in the Federal Register as a city that must obtain an NPDES permit under the Phase II Rule. The rule is designed to comply with the requirements of the Clean Water Act (CWA) to further protect our Nation's streams, rivers, and beaches from polluted storm water runoff. Proposed Phase II regulations follow the 1990 NPDES Phase I Rule, which addressed priority sources of pollutant runoff, including storm water

## Section 4 – Regulatory Permits

pollution from medium and large municipal separate storm sewer systems (MS4s), industrial sources, and construction sites disturbing at least five acres.

### *Objectives*

The United States Environmental Protection Agency's (EPA's) objectives in developing the Phase II regulations include:

1. Provide a comprehensive storm water program that designates and controls additional sources of storm water discharges to protect water quality, pursuant to CWS Section 402 (p)(6).
2. Address discharges of storm water activities not addressed by Phase I, including:
  - All construction site activity involving clearing, grading and excavating land equal to or greater than one acre (including projects that comprise several sites of less than one acre each).
  - "Light" industrial activities not exposed to storm water.
  - Municipal Separate Storm Water Sewer Systems (MS4s) located in urbanized areas not covered under Phase I.
  - Municipally owned industrial facilities that were addressed under Phase I but granted an extension under ISTEA (Intermodal Surface Transportation Act).
3. Facilitate and promote watershed planning as a framework for implementing water quality programs wherever possible.

EPA aims to achieve these objectives by balancing nationwide automatic designation and locally based designation. EPA will designate on a nationwide basis.

- Storm water discharges from small MS4s located in urbanized areas.
- Construction activities that result in land disturbance equal to or greater than one acre.

EPA believes that this designation criteria addresses the main sources of storm water pollution causing significant degradation of surface waters. Permitting authorities (see subsequent definition of permitting authority) may designate additional small MS4s, categories or individual sources of storm water discharges that are problematic in specific communities.

### *NPDES Phase II Rules*

The NPDES Phase II Rules cover the following:

1. Small MS4s (serving a population of less than 100,000 and located in an urbanized area or designated by the permitting authority).
2. Construction activities disturbing one acre or greater.
3. Industrial sources designated by the permitting authority.
4. ISTEA sources (including municipally-owned/operated industrial facilities).

### *NPDES Phase II Permitting Authority for the State of California*

The State of California is authorized to administer the federal NPDES program and the State Water Resources Control Board and its Regional Water Quality Control Board branch is the designated agency responsible for the following:

## Section 4 – Regulatory Permits

- Provide waivers
- Issue Permits
- Issue menu of appropriate Best Management Practices (BMPs) in cases of general permits
- Support local programs
- Oversee programs
- Ensure municipalities have adequate legal authority
- Provide Technical Assistance

### *Storm Water Management Requirements under NPDES Phase II*

1. For MS4s The EPA requires, under the Phase II regulation, that all owners/operators of small MS4s reduce the discharge of pollutants from a regulated system to the "maximum extent practicable" to protect water quality (Federal Register Vol. 63, p. 1574). At a minimum, jurisdictions regulated under Phase II must:

- Specify BMPs for six minimum control measures and implement them to the "maximum extent practicable."
- Identify measurable goals for control measures.
- Show an implementation schedule of activities or frequency of activities.
- Define the entity responsible for implementation.

2. For Construction and Other Activities — Construction activities that disturb one to five acres must also be regulated under an NPDES Phase II permit. The NPDES permitting authority may also require that other facilities and industrial and construction activities, as well as small MS4s outside urbanized areas, be designated on a case-by-case or categorical basis.

These requirements are discussed in detail in the subsequent subsections that follow.

### *Six Minimum Control Measures*

Municipal storm water management programs must specify BMPs for the following six minimum control measures.

1. Public Education and Outreach on Storm Water Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Storm Water Runoff Control
5. Post-Construction Storm Water Management in New Development and Redevelopment
6. Pollution Prevention / Good Housekeeping for Municipal Operations

Storm drain maintenance activities fall under the last minimum control measure. Owners or operators of small MS4s must develop and implement cost-effective operation and maintenance, as well as training programs, with the goal of preventing or reducing pollutant runoff from municipal operations. In the case of storm drain maintenance the primary pollutant of concern will be sediment. Since one of the primary goals of storm drain maintenance is to remove excessive sediment from the pipes, catch basins, channels and detention facilities appropriate BMPs will focus on timing of the maintenance activities, preventing creation of erosion prone banks and preventing accidental discharge of any petroleum products to the storm drain facilities by equipment being employed in the maintenance efforts.

### *Measurable Goals For Control Measures*

The requirement allowing each permittee to identify its own measurable goals for each control measure is unique to Phase II. Communities regulated under Phase I were subject to more prescriptive compliance



## Section 4 – Regulatory Permits

requirements. Examples of measurable goals include:

- Inspecting or repairing a certain number of drain inlets each year.
- Cleaning a certain number of miles of open channel storm drain.
- Inspecting and cleaning a certain number of detention basins.
- Conducting a certain number of training classes for municipal operations each year.
- Reporting the number of volunteers participating in storm drain cleanup programs.

### *Implementation Schedule of Activities or Frequency of Activities*

Regulated communities must show an implementation schedule of activities or frequency of activities that will be done as part of the storm water management program. An example might include the following entries:

#### **Sweep City Streets**

"X" times per year or "X" miles per year

#### **Vacuum Storm Drain Inlets**

"Y" times per year

#### **Conduct classroom storm water education**

"Z" times per year

### *Phase II Permitting Process*

A general permit will most likely be issued by State Water Resources Control Board to cover all MS4s in the state. Permittees such as the City of Redding will most likely submit a Notice of Intent (NOI) to the permitting authority (SWRCB) to be covered under a general permit. The City would be required to identify and submit the following information:

- The BMPs that will be implemented.
- The measurable goals for the minimum control measures.
- The month and year in which each BMP will be started and completed or the frequency of action if it is ongoing.
- The person(s) responsible for implementing or coordinating the storm water management program.

In an effort to improve water quality and subsequently the environmental health of our streams and community resources the City of Redding is seeking participation in the State of California General Small Municipal Separate Storm Sewer System discharge permit. This permit requires that the City address the quality of storm water running off of or through City facilities. Such facilities include all streets, storm drain, flood control Facilities, yards, parks, etc. The permit requires that the City have a plan in place specifying what Best Management Practices (BMP) will be implemented to protect and/or improve storm water quality. The permit requires that the City depend on the experience of other cities participating in the permit over the past decade to identify BMPs that are appropriate and effective thus avoiding the necessity of analytical testing and monitoring. Although most of the City departments/divisions will be impacted in some way or another by the requirements of this permit, the division with the largest burden is expected to be the Storm Drain Utility.

### **F. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)**

The Storm Drain Utility Maintenance and Operation Plan is developed to guide in the maintenance of existing storm drain facilities. It is not the intent of the City of Redding to develop new or modified drainage courses as a part of the maintenance effort. Any new or

## Section 4 – Regulatory Permits

modified drainage course, by City project or private project approvals, will be reviewed by the appropriate agencies prior to any work being done to ensure that all State and Federal regulations related to environmental considerations are considered. This plan speaks to the maintenance of facilities that are already in place and have been there for a number of years.

With regard to the maintenance of existing facilities, Article 19, Categorical Exemptions as defined in the 2002 CEQA Guidelines governs. As indicated, "Section 21084 of the Public Resources Code requires these guidelines to include a list of classes of projects which have been determined not to have a significant effect on the environment, and which shall, therefore, be exempt from the provisions of CEQA."

Contained within Article 19 are several sections which define the various types of Categorical Exemptions. With regard to the Storm Drain Utility Maintenance and Operations Plan, the following sections apply:

**15301. Existing Facilities** – Class 1 consists of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. The types of "existing facilities" itemized within section 15301 are not intended to be all-inclusive of the types of projects which might fall within Class 1." The key consideration is whether the project involves negligible or no expansion of an existing use. Of the examples listed within the section, example (b) which states "Existing facilities of both investor and publicly-owned utilities used to provide electric power, natural gas, sewerage, or other public utility services"

seems to best describe the maintenance functions of the Storm Drain Utility.

**15302. Replacement or Reconstruction** – "Class 2 consists of replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced, as further defined within the section."

Within the examples included in the section, example (c) which states "Replacement or reconstruction of existing utility systems and/or facilities involving negligible or no expansion of capacity" seems to best describe the maintenance functions of the Storm Drain Utility.

**15269. Emergency Projects** – There is further exemption language for Emergency Projects found in section 15269 which outlines various emergency projects which are exempt from the requirements of CEQA. These deal with the projects necessary to restore facilities damaged or destroyed as a result of a disaster and emergency repairs to publicly or privately owned serviced facilities necessary to maintain service essential to the public health, safety or welfare.

Based on the above, the daily and annual work efforts that the Storm Drain Utility will do as described within the Storm Drain Utility Maintenance and Operations Plan are exempt from the CEQA requirements. Also, emergency actions and repairs taken to protect people, property and structures would also be exempt during, between and after storm and flooding events.

## Section 5

# Operational Goals and Objectives

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The success of the program is predicated upon the identification and implementation of specific goals and objectives to enable the City to meet even the most basic needs under current funding constraints as a result of growth and new regulations.

### A. GOAL

To achieve efficient, cost-effective, and environmentally responsible maintenance of the City's storm water infrastructure while successfully meeting all Federal and State regulations, protecting the lives and property of City residents from flooding, enhancing water quality, and preserving our natural wetlands and riparian habitat.

### B. OBJECTIVES

#### *Inventory of Facilities*

- complete and maintain a comprehensive record of all physical facilities the department maintains including quantity, location, physical attributes (measurements, type, makeup), and property ownership.

#### *Needs Assessment*

- establish a common rating system for identifying the condition of a facility at the time of maintenance, e.g., *maintenance needed immediately, maintenance needed sooner than scheduled, regularly scheduled maintenance, only maintain when funds and/or time are available.*
- identify each type of maintenance activity required for all facilities.

- establish desired levels of service in terms of maintenance frequency for each activity by facility type.

#### *Crew Configurations*

- define optimal crew sizes based on the concept that for every activity, there is a combination of people, skills, equipment and materials that result in the most efficient performance of the work. Identify by activity the number and skills of people, types of equipment, and the kinds and amounts of materials required to perform the task most efficiently for each activity.

#### *Planning Elements*

- prepare a list of all tasks and activities performed by the Storm Drain Division for which they need to plan and collect costs.
- develop measurement units for each activity to document the amount of production.
- utilize the output measures to identify unit costs (costs of labor, equipment and materials associated with one unit of production) for use in planning, budgeting, scheduling and reporting of actual accomplishments.

#### *Develop Work Schedules*

- prepare a short-term scheduling program and resource allocation system that facilitates the actual performance of maintenance activities.

## Section 5 - Operational Goals and Objectives

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- develop a long-term work plan and financial plan that make the most efficient use of available resources.
- calculate what cannot be done with existing support levels.
- quantify capital needs and prioritize projects based on the following—growth related; projected life of project; and project infrastructure.

### *Implement a Reporting System*

- purchase software program that will enable the tracking of facility types and quantity, maintenance labor hours, equipment hours and production data.
- evaluate current work flow patterns and develop mechanism that provides for data input and monitoring on a daily basis.
- put measures in place to accurately reflect the work being done or not being done.

It is important to reevaluate maintenance practices on a regular basis. Table 5 - 1 is an example of a performance summary sheet and questions that may be used to conduct such an assessment.

## Section 5 - Operational Goals and Objectives

**Table 5 - 1  
Storm Drain Activities  
Monthly Performance Analysis**

Month/Year _____	Category	Result	Activity	Comment	Summary
	<b>Street Sweeping</b>		Total miles swept		
			Amount of debris collected		
			Number of public inquiries/complaints		
			Hours of equipment downtime		
			Number/type of illegally dumped materials encountered		
	<b>Channels</b>		Number of outfalls inspected		
			Miles of channels inspected		
			Number of channel feet cleaned		
			Volume of debris removed		
			SF of erosion control		
			SF of vegetation control -- chemical		
			SF of vegetation control -- mechanical		
	<b>Catch Basins</b>		Number of catch basins inspected		
			Number of catch basins needing cleaning		
			Number of catch basins needing repair		
			Number of catch basins cleaned		
			Number of catch basins repaired		
			Volume of debris removed		
	<b>Detention/Retention Basins</b>		Number of basins inspected		
			Number scheduled for cleaning		
			Number cleaned		
			Amount of debris removed		
			SF of vegetation control completed -- chemical		
			SF of vegetation control completed -- mechanical		
	<b>Roadside Ditches</b>		Number of feet maintained		
			Amount of debris removed		
			SF of vegetation control completed -- chemical		
			SF of vegetation control completed -- mechanical		

## Section 5 - Operational Goals and Objectives

Summary

Comment

Activity

Result

Category

### Culverts/Pipes

Feet of pipes/culverts inspected	
Feet of pipes/culverts receiving condition assessment	
Feet of pipes/culverts cleaned	
Feet of pipes/culverts repaired	
Number of illicit discharges detected	

### Bridge Area Drains

Number of drains inspected	
Number of drains needing cleaning	
Number of drains cleaned	
Number of drains needing repair	
Number of drains repaired	

### Miscellaneous

Miles of access road maintained	
Feet of fence repaired	
Number of public inquiries/complaints re storm drain related items	
Number of public inquiries/complaints requiring field review	
Number of special event requests	
Hours of storm drain related training received	

### Assessment questions:

- Make comparisons and evaluate what is and isn't working.
- Are maintenance staff aware of how their actions affect storm water quality?
- What additional training is needed for staff?
- Has staff been making improvements – evaluate time/activity.
- Are the BMPs working successfully – what practices need to be added/changed.
- Were any major costs savings realized?
- What additional resources and/or capital is needed to continue with a successful maintenance program?
- Ideas for improving or modifying existing BMPs for efficiency and/or effectiveness.

## Section 6

# Recommended Maintenance Practices

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Storm Water facilities must be maintained or they will not function properly. Determining what is adequate comes from experience, industry identified best management practices, general good housekeeping methods, and standards for levels of maintenance. These levels of maintenance may vary from year to year as the system expands, ages, and/or State and Federal regulations are changed.

Performance of adequate maintenance will ensure flood control management and provide protection for the health and safety of City residents and properties. Adequate flood management is established by flood plain analysis, storm drain master planning, and engineering design of public facilities to convey flood peaks. Such design accounts for significant accumulation of sediment, debris or vegetation. Therefore, adequate conveyance can only be assured by preventing such accumulation which defines the level of maintenance required.

As a part of the overall operations and maintenance plan, an outline for specific maintenance practices has been developed. These practices included defined maintenance activities, standards, scheduling and reporting procedures. It is important to recognize these practices as general guidelines and may need to be tailored to meet specific situations.

Additionally, these practices will remain dynamic, be actively reviewed, and updated annually.

### A. RECOMMENDED MAINTENANCE WORK ACTIVITIES

Maintenance work activities identify all major maintenance work and include activities which

are performed frequently and in amounts that make them a significant part of the total work program. Each activity must be clearly defined so maintenance personnel at all levels of management uniformly understand the operation to be performed and/or the type of deficiency, if any, to be corrected.

Personnel who plan, schedule, perform, report, or evaluate maintenance work must know what each work activity means. Work activities are used for the following purposes:

- ▶ Planned maintenance work is identified in the annual maintenance work plan by activity name and number.
- ▶ Activity names and numbers are used for authorizing, assigning, and reporting work.
- ▶ Activity names and numbers are used on work scheduling guides and work performance summaries.

Work measurement units are established for the major maintenance activities. For example, "Curb Miles" is the work measurement unit for street sweeping while "Linear Feet" is the work unit for cleaning channels, ditches, culverts, and pipes. These measurement units are used to describe how much work is planned and to report how much work is accomplished for each activity.

For some activities, specific work measurement units – other than labor hours – would not be meaningful. An example of this is in the miscellaneous maintenance activities which includes a number of different operations. Many of these activities cannot be measured by a common unit other than labor hours.

## Section 6 - Recommended Maintenance Practices

Below, Table 6-1 identifies the recommended Maintenance Work Activity List for the Utility which includes an assigned activity number and work measurement unit. Table 6-2 compares the current and recommended frequencies of each maintenance activity. Table 6-3 provides an analysis of the maintenance activities by translating the work

into the current number of hours available annually to perform the task; showing the hours needed to meet the recommended practices as identified in the performance standards; the shortfall in personnel man hours to meet the recommended maintenance practices; and, the consequences resulting from the shortfall in personnel hours.

**Table 6 - 1  
Maintenance Work Activity List**

<b>Activity Number</b>	<b>Activity Name</b>	<b>Work Measure Unit</b>
10-00	Inspect Channels and Earthen Ditches	Miles
15-00	Clean Channels and Earthen Ditches	Linear Feet
20-00	Inspect and Clean Detention Basins	Each
25-00	Inspect and Clean Roadside Ditches	Linear Feet
30-00	Inspect, Clean and Repair Catch Basins/Inlet Structures	Each
35-00	Clean and Flush Bridge Area Drains	Each
40-00	Inspect and Clean Culverts/Storm Drain Pipes	Linear Feet
45-00	Repair Culverts/Storm Drain Pipes	Linear Feet
50-00	Street Sweeping Operations	Curb Miles
55-00	<b>Miscellaneous Activities:</b>	
-01	Vehicle and Equipment Maintenance	Labor Hours
-02	Engineering Field Assistance	Labor Hours
-03	Response to Storm Drain Inquiries/Complaints	Labor Hours
-04	Response to Street Sweeping Inquiries/Complaints	Labor Hours
-05	Assisting other Redding Municipal Utilities Divisions	Labor Hours
-06	Assisting other City Departments	Labor Hours
-07	Employee Training	Labor Hours
-08	Material Disposal (trips and amount disposed)	No. of Trips/Tonnages
-09	Maintain Erosion Control	Square Feet
-10	Vegetation Control – Mechanical	Square Feet
-11	Vegetation Control – Chemical	Square Feet
-12	Maintain Access Roads	Miles
-13	Fence Repair (chain link/wood)	Linear Feet



## Section 6 - Recommended Maintenance Practices

**Table 6 - 2**  
**Maintenance Work Activities**  
**Current and Recommended Frequencies**

Activity	Current Frequency	Recommended Frequency	Annual Activity Frequency Increases
<b>Street Sweeping</b>			
Residential	6 times/year	12 times/year	6 times/year
Commercial	52 times/year	52 times/year	None
<b>Channels</b>			
Inspection	1 time/year*	1 time/year*	None
Cleaning	1 time every 2 years	1 time/year*	1 time/year
<b>Catch Basins</b>			
Inspection	1 time every 5 years	1 time/year*	1 time/year
Cleaning	As needed**	1 time/year***	1 time/year
Repair	As needed**	2% of structures annually	2% of structures annually
<b>Detention/Retention Basins</b>			
Inspection	1 time/year*	1 time/year*	None
Cleaning	1 time every 2 years	1 time every 2 years	None
<b>Culverts/Pipes</b>			
Inspection	As needed	1 time every 3-5 years	1 time every 3-5 years
Cleaning	1 time every 3-5 years	1 time every 3-5 years	None
Repair	Pending funding****	Pending funding****	None
<b>Roadside Ditches</b>			
Inspection	As needed**	1 time/year	1 time/year
Cleaning	As needed**	1 time/year***	1 time/year
<b>Bridge Area Drains</b>			
Inspection	2 times/year	2 times/year	None
Cleaning	2 times/year	2 times/year	None

\* Additional inspections may be required after major storm events

\*\* Cleaning and repairs are currently prompted by public request or flooding. General maintenance is performed as time permits.

\*\*\* This will be in the first year only to allow for a thorough inspection of structures in order to schedule repairs. Subsequent annual cleaning will be based on inspection findings.

\*\*\*\* The only capital available for major repairs is developer driven.

## Section 6 - Recommended Maintenance Practices

**Table 6 - 3**  
**Maintenance Activity Analysis**  
**Anticipated Implementation FY 03/04**

Activity	Hours to Accomplish Recommended Activities	Distribution of Existing Personnel Hours	Personnel Hour Deficit	Consequence
<b>Street Sweeping</b>	2,432	1,760	672	2,520 curb miles unswept annually
<b>Channels</b>				
Inspection (including all outfalls)	752	520	232	One third of the channels/outfalls will not be inspected annually
Cleaning	2,120	1,740	380	Of the channels scheduled for maintenance annually, one-half will not be cleaned
<b>Catch Basins</b>				
Inspection	928	192	736	4,050 catch basins not inspected
Cleaning/Repair	4,176	832	3,344	4,140 catch basins not cleaned/repared
<b>Detention/Retention Basins</b>				
Inspection	24	8	16	40 basins not inspected each year
Cleaning	194	24	170	19 basins not cleaned annually
<b>Culverts/Pipes*</b>	300	180	120	Maintenance will be limited and the condition assessment will not be accomplished.
<b>Roadside Ditches**</b>				
Inspection	0	160		See footnote.
Cleaning/Repair	0	120		See footnote.
<b>Bridge Area Drains</b>	88	64	24	Only 1/3 of the area drains being inspected/maintained annually.
<b>Holidays/Vacations/Sick Leave</b>	2,176	1,600	576	Hours reflect holidays and sick leave only for 3 additional fulltime entry level maintenance worker positions
<b>Miscellaneous Activities***</b>	3,490	3,200	290	Shortfall may occur should public or interdepartment requests of storm drain personnel increase.
<b>Totals</b>	16,680	10,400	6,280	

\* Condition assessment of the city-wide pipe system will be spread over 5 years.

\*\* No records are available for estimation. Maintenance is prompted by public request or flooding. A thorough inventory and inspection of structures is scheduled for completion in FY 03/04. Inspections will continue to be done annually and subsequent cleaning will be based on inspection findings.

\*\*\* Miscellaneous activities include but are not limited to special events, employee training, engineering field assistance, etc.

## Section 6 - Recommended Maintenance Practices

### B. RECOMMENDED PERFORMANCE STANDARDS

"Performance Standards" have been established for each of the major maintenance work activities. These performance standards specify:

- The most effective crew size.
- The kinds and number of equipment required.
- The major types of material that should be used.
- Recommended procedures for performing the work.
- An estimate of expected average daily accomplishment with standard crew size, equipment and procedures.
- Authorization and scheduling criteria.

Following is an item-by-item description of the format of the performance standards.

1. **Activity Identification/Date** The activity name is shown as well as the "effective date" of the performance standard to be used when updating or replacing performance standards.
2. **Description and Purpose** The Description and Purpose section of the performance standards explains the work activity and the kinds of defects to be corrected or reasons for doing the work.
3. **Authorized By and Limits On Work Category** The "Authorized By" category will specify the level of authority responsible for authorizing the work. This is to insure that certain activities requiring special equipment, coordination, or expertise will not be scheduled or performed without the proper approval. The type of control to be placed on the quantity or area in which work will be performed is identified.
4. **Performance Criteria** This section includes important information for the "scheduler" about when to schedule the work and for the crew leader to identify the work to be done.
5. **Crew Size** The crew size outlines the numbers of personnel needed to do the work. The crew size is based on average conditions. Sometimes, there will be a need to add or delete people to satisfy special traffic safety conditions or hauling requirements.
6. **Equipment** The basic requirements for major pieces of equipment are listed. Situations such as the breakdown, unavailability of equipment, or special materials hauling requirements may require the addition, deletion, or substitution of equipment.
7. **Materials** The materials section includes a list of the major materials to be used for the activity.
8. **Work Method** The work method outlines, step-by-step, the recommended procedures for performing the work. Each step should be performed in order to correctly maintain the feature as well as provide the quality of work desired.
9. **Average Daily Production** The average daily production is an estimate of the amount of work a crew can accomplish during a day using the recommended crew size, equipment, materials and work method. This estimate is shown as a range and should be attainable over a period of time. Some days the accomplishment may be more or less than the estimate, but eventually, the average should fall in line.

## Section 6 - Recommended Maintenance Practices

10. Notes Any other relevant, helpful information or instructions.

### *Use of Performance Standards*

Maintenance supervisory personnel should become thoroughly familiar with these performance standards. It is important that the performance standards be used when making assignments and performing work. Some situations will require deviation from the performance standards--such as more or fewer flagmen or additional vehicles/equipment. These situations are recognized, and crew leaders are expected to consider such situations when organizing and managing their activities.

Personnel and equipment needs should be determined using factors such as haul distance and time estimates (spot, dump, load, and cycle times.)

The performance standards also provide guidance and a measure for supervisors to use when evaluating work in progress and completed.

Field personnel are in the best position to identify new or better work methods or difficulties with the current performance standards. These suggestions for improvements or questions should be directed to the crew leader or supervisor.

The performance standards should be reviewed and updated annually. If other changes occur that require more frequent review and update or development, the performance standards can be changed to suit these needs.

The following table provides a sample Performance Standard Form. Performance Standards have been established for all storm

drain activities utilizing the recommended format and guidelines. These may be found under Appendix B.

## Section 6 - Recommended Maintenance Practices

**Table 6 - 4  
Performance Standard**

<b>ACTIVITY NUMBER</b>  50-00	<b>NAME</b>  STREET SWEEPING OPERATIONS	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Street sweep city owned and maintained roadways throughout the community to remove dirt, debris, and reduce pollutants in storm water runoff for health, safety and appearance.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  City Limits
<b>PERFORMANCE CRITERIA</b>  Plan to sweep residential, commercial and state contracted routes as indicated in the street sweeping route booklet.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> 1 Sweeper Operator <input type="checkbox"/> 1 Maintenance Worker (as necessary) <input type="checkbox"/> <input type="checkbox"/> 1.5 TOTAL	1. A.M. Inspection of equipment, check fuel and oil levels, proceed to work site location. 2. Sweep designated route each day. 3. Transport all debris to designated dump site. 4. End of shift, return to Corp Yard, wash out, fuel up, clean equipment and prepare for next day of work.
<b>EQUIPMENT</b>	
<input type="checkbox"/> 1 Street Sweeper <input type="checkbox"/> Appropriate Hand Tools <input type="checkbox"/> <input type="checkbox"/>	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> Water <input type="checkbox"/> Gutter Brooms <input type="checkbox"/> <input type="checkbox"/>	30 Curb Miles Per Day
<b>NOTES:</b> Inform Street Supervisor of any roadways not swept and those that can only be partially cleaned.	

## Section 6 - Recommended Maintenance Practices

### C. RECOMMENDED WORK SCHEDULING

The objectives of work scheduling are:

- Complete the planned amount of work.
- Perform the work when it should be done.
- Prioritize the work.
- Utilize the proper people, equipment, and supplies to do the work.
- Ensure to the extent possible that all flood control facilities are functioning at design capacity during a storm event.
- To have procedures in place to effectively handle emergencies.

Three tools are available to help the supervisor meet these objectives. The *Work Program* defines the estimated amount of work and the estimated labor-days required for each activity to provide the desired levels of service; a *Work Calendar* helps to establish when the various activities should be done; and, the *Performance Standards* provide information about quantity standards, personnel requirements and how much work can be done in a given time.

The annual work program establishes the kinds and amount of work to be done during the year and the resources that will be required to do that work. This annual plan needs to be broken into weekly and monthly plans for effective scheduling work and to permit timely evaluations of work program performance.

The process of "distributing" the annual work load throughout the year is done by allocating a part of the work (in labor-hours, by activity) to specific months. Some types of work – emergency or service activities – must be done throughout the year as the need arises. Other

types of work must be accomplished on a regularly scheduled basis – such as preventive maintenance work. Finally, some types of work can only be done during certain seasonal periods, but can be shifted from one month to the other, and still other work can be done almost any time during year.

These factors must be considered when distributing the different types of work. Preventive maintenance and other types of work which must be performed on a regularly scheduled basis are distributed so as to level labor power needs as much as possible. Finally, work which can be performed any time is distributed to those months with the fewest labor-days. In this way, staffing needs are kept as uniform as possible resulting in more efficient use of available labor power.

A work calendar lists – activity by activity – the labor-hours for each month. These labor-hours are used in conjunction with the work program annual work quantities for work scheduling and the preparation of periodic Activity Status Reports.

Once the work program and staffing levels have been set, the work load distribution can be finalized and the calendar prepared to summarize/communicate the planned monthly distribution of the work program.

Work scheduling is the process of using the Work Calendar and specific scheduling procedures to plan ahead, establish work priorities and accomplish the work.

The performance standards apply to corrective and preventive maintenance activities. These procedures are not as rigid or foolproof as implied by the description. Equipment breakdowns, emergencies, or bad weather will disrupt a schedule – but part of the scheduling process is to be aware that

## Section 6 - Recommended Maintenance Practices

these situations will occur and to be prepared to respond with little or no difficulty.

Items to consider when completing the Work Calendar should include:

- Good estimates will improve the scheduling process significantly. Take time to estimate the amount of work needed and the number of hours required to do the work. The performance standards, inspections and sound judgment based on experience all help the estimating process.
- It is usually best to prepare a schedule and work assignments assuming everything will work as planned – no equipment breakdowns, no emergencies, etc. However, make sure a backlog of “alternate” work is available so that little time is wasted when adjustments to the schedule must be made.
- Weather and seasons must be considered when planning work.
- Vacations, injuries and illnesses must be anticipated.
- Some guidelines for identifying alternate work are
  - ▶ Low priority work that needs to be done, but not necessarily during the next week or so.
  - ▶ Work that does not require special equipment or a lot of preparation time.
  - ▶ Preventive maintenance on light equipment.

- Note that it is not necessary to “formally schedule” obvious day-to-day routine activities. It is necessary, however, to regularly check the work reports and accomplishments to verify the distribution of work assignments. A periodic review and adjustment of the work assignments may be necessary to maintain a “balanced work load.”

A sample Work Calendar is shown in Table 6-5 on the following page.

## Section 6 - Recommended Maintenance Practices

**Table 6 - 5  
Work Calendar**

### STORM DRAIN UTILITY WORK CALENDAR

Fiscal Year: \_\_\_\_\_  
Date Prepared: \_\_\_\_\_

Activity Identification		Monthly Distribution of Time in Hours*												Total Per Activity
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
10-00	Inspect Channels and Earthen Ditches													
15-00	Clean Channels and Earthen Ditches													
20-00	Inspect and Clean Detention Basins													
25-00	Inspect and Clean Roadside Ditches													
30-00	Inspect, Clean, and Repair Catch Basins/Inlet Structures													
35-00	Clean and Flush Bridge Area Drains													
40-00	Inspect and Clean Culverts/Storm Drain Pipes													
45-00	Repair Culverts/Storm Drain Pipes													
50-00	Street Sweeping Operations													
55-00	Miscellaneous Activities													
	Employee Benefits**	134	134	133	133	134	134	133	133	133	133	133	133	1,600
	<b>Total Hours Per Month</b>	<b>868</b>	<b>868</b>	<b>868</b>	<b>866</b>	<b>866</b>	<b>866</b>	<b>866</b>	<b>866</b>	<b>866</b>	<b>866</b>	<b>866</b>	<b>868</b>	<b>10,400</b>

- \* Calendar work hours are based on 5 employees each working a total of 220 days annually.  
 \*\* Time identified includes city employee averages of 8 sick days, 19 vacation days and 13 holidays per year.

Prepared By \_\_\_\_\_



## Section 6 - Recommended Maintenance Practices

### D. ACTIVITY REPORTING

Comprehensive maintenance programs include procedures for reporting and summarizing work accomplished and labor-hours used for maintenance activities. This information enables the manager/supervisor to compare actual performance with the planned work program. These planned, actual comparisons, conducted on a regular basis, are essential for effective management and control of the work program.

The reporting procedures provide specific information:

- What facility required work.
- What work was done by activity.
- How much of each activity was done.
- The labor-hours used to accomplish the work.

This information will be used by managers in their effort to:

- Make sure the right kinds and amounts of maintenance work are done.
- Identify the problem areas and related corrective actions.
- Develop future work programs and budgets.
- Identify opportunities for improved productivity.

The work report process consists of daily completion of a simple form as outlined in the following section.

#### Daily Work Activity Report

The Daily Work Activity Report will be used to record and summarize (1) the kinds and amounts of work performed by maintenance personnel, (2) the number of labor-hours used to do that work, and (3) the cost of the work.

The report can be used to summarize all work activities. It will also aid in capturing a complete inventory of all facilities that were cleaned and inspected for any given time frame. This will be especially helpful when preparing the annual work calendar and annual budget.

All Working Supervisors will prepare the Daily Work Activity Report. The following instructions are for the completion of the sample Daily Work Activity Report shown on Table 6-6.

1. **Identification Data** This includes the date the work is performed; number of pages required to accurately capture all activities for that date; the employees' names and ID numbers; and, the signatures of the employee completing the report and of the supervisor monitoring and/or overseeing the activities for that day. On the sample Daily Work Activity Report form you will see that the employee names and ID numbers have been pre-printed. Whenever additional pages are needed to document combinations of activities or extra employees, number the pages accordingly.
2. **Item Number** This is a preprinted consecutive number that is simply used as an identifier for an activity when recording the detailed information for that activity on the bottom half of the report form. This will minimize repetitive entry of related information.
3. **Activity Name** Write out the name of the activity being performed. Use the activity names as identified on the *Maintenance Activity List*.
4. **Activity Number** This number consists of four digits, e.g., 25-00. The first two

## Section 6 - Recommended Maintenance Practices

digits are the major code and the second two digits are considered the secondary code. The secondary code is primarily used in connection with the miscellaneous major code "55". However, the secondary code will be used as an identifier with some major codes, e.g., disposal of materials for certain activities, response to a citizen inquiry/complaint. In the space provided, enter the number of each activity performed on that specific day. Use the *Maintenance Activity List* or the *Performance Standards* to complete the blank.

5. **Labor Hours** Record the number of hours worked by each employee, by the appropriate activity. Record the time spent to the nearest quarter-hour. For example, record 1 hour and 45 minutes as 1.75 and 3 hours and 20 minutes as 3.25 hours.
6. **Equipment Unit Numbers/Hours of Use** Enter the assigned equipment number of any mechanical equipment which was used to perform the specific activity and the number of hours it was used for the specific activity. Reference the *Vehicle and Equipment Inventory* in the Appendix for correct identification numbers.
7. **Facility ID** When available, enter the specific identification for the facility and/or attach a list of the facilities to the activity report. Examples of Facility ID are: 16R-A (street sweeping route); S12-50 (specific catch basin identifier); 150 (specific channel identifier); etc.
8. **Location** Identify the location of the activity. Provide as detailed a location as is pertinent to the activity. For example, 1300 Yellowstone St (address location for a specific catch basin); Hartnell Ave

between Churn Creek and Victor Ave (fence repaid); Linden Channel (inspection of an entire channel); etc.

9. **Work Performance** Provide a brief description of the work performed, materials used, the use of non-City personnel, etc.
10. **Quantity/Unit of Measure** Measure and record the amount of work done for each activity. Use the correct measurement unit for each activity (reference *Maintenance Activity List*). Record the amount of work done to the nearest whole unit. Record labor-hours to the nearest hour. For activities with labor-hour as the unit of measure, the "quantity" will be exactly the same as "total hours" for the activity.
11. **Notes/Comments** Provide any additional relevant information that may be of use in summarizing and analyzing the work activity data.

Optimally, this information will be keyed daily into a Storm Water Management software program. However, until a software program is purchased and installed, this information may be captured in a spreadsheet format.

## Section 6 - Recommended Maintenance Practices

**Table 6 - 4**  
**STORM DRAIN UTILITY**  
**DAILY WORK ACTIVITY REPORT**

Item Number	Activity Name	Activity ID Number	<div style="display: flex; justify-content: space-around; text-align: center;"> <div>Alves 0235</div> <div>Campbell 1165</div> <div>Isitt 3838</div> <div>Jackson 4042</div> <div>Stacher 7970</div> <div>TOTAL HOURS</div> </div>						<div style="display: flex; justify-content: space-between;"> <div>DATE WORK PERFORMED: 12-01-02</div> <div>PAGE: 1 of 1</div> </div>		
			Labor Hours						Equipment Unit Numbers/Hours of Use		
1	Channel inspection	10-00			8			8	217 / 3		
2	Catchbasin Cleaning	30-00		3		4	3	10	275 / 4	277 / 1	
3	Street Sweeping	50-00	6.5					6.5	233 / 6.5		
4	Citizen Request	30-03		1			1	2	277 / 1		
5	Fence Repair	55-13		4		4	4	12	275 / 4	277 / 2	
6	Disposal-Street Sweeping	50-08	1.5					1.5	233 / 1.5		
7											
8											
Total Regular Hours			8	8	8	8	8	40			
Total Overtime Hours											

Item Number	Facility ID	Location	Work Performance (Description of task, materials used, etc.)	Quantity	Unit of Measure
1	150	Entire channel	Inspection	7	Miles
2	Attached	Silver Creek Subdivision	Clean and repair catchbasins	30	EA
3	16R-A		Street sweeping	35	Miles
4	S12-50	Winwood Court	Citizen request to check plugged catchbasin	1	EA
5		Shasta View Dr @ Victor Ave	Repair chain link fence	300	LF
6		Corp Yard	Disposal of street sweeping debris	2/4	Trip/Tons

NOTES/COMMENTS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Report Completed By \_\_\_\_\_

Supervisor's Signature \_\_\_\_\_

## Section 6 - Recommended Maintenance Practices

### E. NEW FACILITY ADDITIONS

Storm drain infrastructure is added to the system by several means:

- In-house construction and maintenance projects;
- New development that is accepted for maintenance;
- Additions and/or maintenance projects performed by Encroachment Permits; and
- Taking over existing infrastructure through annexation or an agency maintenance agreement.

The procedures for obtaining "as-built" information and maintaining the inventory varies slightly depending upon how the infrastructure was added to the system, as noted above.

1. In-house construction and maintenance projects – These projects are typically designed by the Engineering Division, but may be designed by a consulting engineer on behalf of the Storm Drain Utility. The projects are bid out through the normal City bidding process and typically are inspected by Engineering Division Inspectors, although very large projects may use contract inspection. During the "final punch list" walkthrough of the project, the Engineering Division representative is accompanied by Storm Drain Utility field personnel and a Municipal Utilities technician. Each of these staff personnel makes individual annotations and markups. These markups are incorporated into "as-built" drawings by the Engineering Division. The "as-builts" are forwarded to the GIS Division for inclusion in the atlas system. Once an

Inventory Management Software System is in place, this data will also be added to the system by a member of the Storm Drain Utility staff. Upon completion of the project, the inspectors forward construction drawing markups to Engineering Division personnel to be "As-built" and placed in the drawing archive. These drawings will be checked and verified against the atlases by Engineering staff and then sent for scanning.

2. New development that is accepted for maintenance – New development is typically designed by outside engineering firms. Approved plans are placed in the Engineering drawing system. During the "final punch list" walkthrough of the development, the Engineering Division representative is accompanied by Storm Drain personnel and a Municipal Utilities Technician. These staff members make annotations and markups of their findings which are incorporated into "as-built" drawings by the Engineering Division. These "as-builts" are forwarded to the GIS Division for inclusion in the atlas system. Again, once an Inventory management Software System is in place, this data will also be added to the system by a member of the Storm Drain Utility staff. Upon completion of the development Engineering inspectors forward construction drawing markups to Engineering Division personnel to be "As-built" and placed in the drawing archive. These drawings will be checked and verified against the atlases by Engineering staff and then sent for scanning.
3. Additions and/or maintenance projects performed by Encroachment Permit – These projects are usually small in scale and generally consist of short extensions

## **Section 6 - Recommended Maintenance Practices**

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of storm drain pipes, the addition of a catch basin, or regarding and possibly adding a concrete invert to an existing earthen ditch. The work is inspected by Engineering inspectors and the Permit is signed off upon completion. Copies of completed encroachment permits are forwarded to both the Municipal Utilities Technician and GIS Division for inclusion in the atlas system.

4. Taking over existing infrastructure through annexation or an agency maintenance agreement – This is extremely infrequent and additions to the system are typically made by field review of the Storm Drain Utility staff of any existing records from the agency. Once reviewed, markups are forwarded to the GIS Division for inclusion in the atlas system. (Note: If an inventory management system is in place, this data will also be added to the system by a member of the Storm Drain Utility staff.)

## Section 7

### Financial Issues

Creation of the Storm Drain Utility in 1993 was to create a funding mechanism for the three major components of the Utility: (1) daily operations and maintenance; (2) capital improvements; and (3) costs associated with the anticipated NPDES program mandates. Responsibilities identified for the Utility at the time of formation were:

- Planning, design, and construction of the public storm drainage system including the inspection, operation, and maintenance of the complete system;
- Street sweeping of City streets to reduce chemicals, hazardous materials, debris, and other pollutants from entering the storm drainage system;
- Preparation of public information designed to educate and inform the general public on the need to reduce surface pollution; and
- Monitoring of all state and federal regulations relating to storm drainage management and surface pollution reduction

#### A. UTILITY SERVICE CHARGE

In order to meet these responsibilities, a Storm Drain Utility service charge was developed. The monthly charge was based on the classification of property user groups (*single-family residential, multi-family residential and commercial/institutional*) and a land use-based impervious acreage factor (IAF). The IAF is a factor for each land use which, when multiplied by a parcel's actual acreage, derives the estimated impervious surface of that parcel. The impervious area is that which

prohibits the natural drainage of rainwater into the ground (i.e., buildings, parking lots, sidewalks, etc.) This service charge was imposed on each developed lot and parcel of land within the City. A flat fee is assessed against single-family residential and multi-family residential, while a calculated amount is developed for commercial and industrial based on size configurations.

The table below identifies the service charges established in September 1993 for each of the customer groups. These are the same rates being charged today.

Customer Group	Service Rate
Single-Family Residential	\$ 1.32/unit
Multi-Family Residential	\$ .83/unit
Commercial and Institutional	\$19.07/IA*

\*Impervious Acreage

Revenue for the first full year of operation (FY 1994/95) from the utility service charge was \$797,090 (See Table 7-1, *Utility Revenue /Expenditure History on the following page*). However, review of the first year operations of the Utility revealed that the storm drain service charge revenue was insufficient to fund all three of the components of the Utility. In fact, funding only covered maintenance costs. The shortfall in funding also resulted in the need to decrease the levels of service provided on certain storm drain tasks/facilities.

While an increase in revenue from new development has been recognized over the past 10 years, the quantity of storm water facilities and the cost of maintenance services have also increased accordingly.

Table 7 - 1  
Utility Revenue/Expenditure History

Revenue	Actual Numbers							Budget Numbers	
	FY 1994-95	FY 1995-96	FY 1996-97	FY 1997-98	FY 1998-99	FY 1999-00	FY 2000-01	FY 2001-02	FY 2002-03
Monthly Charge	797,089.89	805,027.86	829,997.14	833,631.65	810,716.07	845,528.58	847,660.00	876,251.30	870,660.00
Street Cleaning	16,680.00	16,680.00	19,900.00	19,460.00	16,680.00	16,680.00	16,680.00	16,720.00	16,700.00
Interest	31,787.11	16,987.74	26,620.52	17,660.34	9,445.19	14,921.80	22,851.91	15,551.37	22,680.00
Misc	220.00	237.95	7,609.72	-	3,223.00	-	-	50.00	-
Transfer from Development Fund									
<b>Total Revenue</b>	<b>846,777.00</b>	<b>838,933.55</b>	<b>878,127.38</b>	<b>870,782.19</b>	<b>840,064.26</b>	<b>877,130.38</b>	<b>887,191.91</b>	<b>908,672.67</b>	<b>910,060.00</b>
<b>Expense</b>									
Personnel	414,790.94	378,498.49	340,913.83	345,816.74	324,694.34	352,100.45	293,699.22	306,245.35	327,240.00
O&M	271,710.56	394,643.26	377,013.81	366,981.55	379,481.00	354,252.88	405,738.01	448,132.32	477,370.00
Capital proj & equip	99,058.39	202,980.66	297,494.71	397,883.60	273,952.71	419,326.41	154,622.18	323,348.64	679,090.00
<b>Total Expense</b>	<b>785,559.89</b>	<b>976,122.41</b>	<b>1,015,422.35</b>	<b>1,110,681.89</b>	<b>978,128.06</b>	<b>1,125,679.74</b>	<b>854,059.41</b>	<b>1,077,726.31</b>	<b>1,483,700.00</b>

## Expenditure History by Division

## Division 801 -- General and Administration

Personnel & x-charges	145802.98	85268.89	99,309.86	94,520.94	84,042.51	96,636.67	65,476.51	103,408.56	50,670.00
O&M	48668.4	147508.13	120,332.53	110,663.30	129,511.97	95,803.09	135,586.66	139,735.86	155,230.00
I/D charges	64112.03	75894.03	87,092.49	95,586.58	85,836.37	111,225.22	113,874.44	147,402.12	139,980.00
Capital & equipment									
<b>Division total</b>	<b>258,783.41</b>	<b>311,672.05</b>	<b>306,734.88</b>	<b>300,770.82</b>	<b>299,390.85</b>	<b>303,664.98</b>	<b>314,947.61</b>	<b>390,546.54</b>	<b>345,880.00</b>

## Division 802 -- Maintenance

Personnel & x-charges	170212.05	189823.59	195,968.40	201,860.92	185,627.70	204,472.85	176,291.80	151,975.81	219,250.00
O&M	34743.31	29250.72	35,068.28	40,884.10	59,630.47	57,802.31	77,323.34	101,272.93	60,730.00
I/D charges	36194.02	38873.01	29,137.36	32,477.91	36,906.98	29,538.12	27,788.00	27,360.00	26,600.00
Capital & equipment									
<b>Division total</b>	<b>241,149.38</b>	<b>257,947.32</b>	<b>260,192.02</b>	<b>275,222.93</b>	<b>282,165.15</b>	<b>291,813.28</b>	<b>281,403.14</b>	<b>280,608.74</b>	<b>306,580.00</b>

## Division 803 -- Street Sweeping

Personnel & x-charges	98775.91	104006.01	45,817.57	49,434.88	55,024.13	50,990.93	51,930.91	50,860.98	57,320.00
O&M	27014.03	36721.92	24,987.25	44,311.86	34,871.41	20,245.34	12,084.37	3,718.05	61,270.00
I/D charges	55455.84	66394.45	80,965.92	43,057.80	32,937.64	39,638.80	33,771.20	33,364.80	33,560.00
Capital & equipment									
<b>Division total</b>	<b>181,245.78</b>	<b>203,522.38</b>	<b>151,000.74</b>	<b>136,804.54</b>	<b>122,833.18</b>	<b>110,875.07</b>	<b>97,786.48</b>	<b>87,943.83</b>	<b>152,150.00</b>

## Division 809 -- Capital Outlay

Personnel & x-charges					(213.84)		5,300.00	(4,721.44)	
O&M									
I/D charges	5322.93								
Capital & equipment	99058.39	202980.66	297,494.71	397,883.60	273,952.71	419,328.41	154,622.18	323,348.64	679,090.00
<b>Division total</b>	<b>104,381.32</b>	<b>202,980.66</b>	<b>297,494.71</b>	<b>397,883.60</b>	<b>273,738.87</b>	<b>419,328.41</b>	<b>159,922.18</b>	<b>316,627.20</b>	<b>679,090.00</b>
<b>Fund Total</b>	<b>786,569.89</b>	<b>976,122.41</b>	<b>1,016,422.35</b>	<b>1,110,681.89</b>	<b>978,128.06</b>	<b>1,125,679.74</b>	<b>854,059.41</b>	<b>1,077,726.31</b>	<b>1,483,700.00</b>

## Section 7 - Financial Issues

### B. CAPITAL IMPROVEMENTS AND DEVELOPMENT FEE FOR STORM DRAIN IMPROVEMENTS

The 1993 City-Wide Storm Drain Master Plan (referred to as the Montgomery Watson Study) was prepared to determine capital improvement infrastructure needs and provide a mechanism for funding such improvements. The mechanism established was a storm drain utility service charge basing fees on impervious area attributable to different land uses.

Following completion of the capital improvement plan, the fee structure was altered in such a manner to substantially reduce the total income expected from the Storm Drain Utility. In addition, changes in environmental requirements and resource agency attitudes in the last ten years have dramatically increased the complications and costs associated with construction of storm water drainage improvements. For example, the Master Plan estimated the Clover Creek detention basin at \$1.7 million. The actual cost will be over \$5 million.

Funding for storm water drainage improvements associated with new development can be charged to the storm drain impact fee account. Because of the amount of development that has occurred over the past decade (with and without adequate storm water drainage impact mitigation) a new development nexus can be drawn on virtually every channel. However, the storm drainage impact fees are not being used exclusively for capital improvement projects listed in the 1992 master plan. For example, they will also need to pay for a Master Plan update.

The Storm Drain Development Impact Fee as of January 2, 2003 is as follows:

Customer Group	Impact Fee
Single Family Home	\$ 252.00
Multi-Family/Dwelling	\$ 123.74
Commercial, per 1,000 SF	\$ 157.90
Office, per 1,000 SF	\$ 145.01
Industrial, per 1,000 SF	\$ 105.70

The projected Impact Fee revenue can be reviewed in the Storm Drain Utility Revenue and Expenditure Plan. (See Table 7-4)

The combination of inadequate funding to meet the expected capital improvement costs, impact fee project requirements and increased costs associated with storm water drainage improvement projects, due to environmental and resource agency concerns, has resulted in a need for a new Storm Water Drainage Master Plan (Plan). To date, no significant progress has been made toward achieving any of the outlined 1993 Master Plan improvement projects.

The strategy for the new Plan is to revise the 1993 plan to provide flood protection through the creation of regional detention/retention basins including the following tasks:

- ▶ revise flood plain hydrology, hydraulic analysis and flood plain maps;
- ▶ account for infrastructure constructed in the last decade;
- ▶ define regional detention opportunities in all storm drainage basins;



- ▶ provide planning level feasibility studies for three to five regional detention facilities;
- ▶ provide a programmatic plan for a detailed inventory and assessment of facility condition;
- ▶ to provide the basis for future master planning efforts to include a more detailed repair and replacement program;
- ▶ provide a capital improvement plan for future storm water drainage infrastructure; and,
- ▶ provide a capital improvement financial plan.

The initial strategy for accomplishing this Plan within a limited budget was to extend a contract to a local hydrologist for the revised flood plain hydrology, hydraulic analysis and flood plain maps; review this information for concurrence; and, pass it on to a consultant for completion of the remaining components of the plan.

Progress on the Plan project is pending completion of the City of Redding Storm Water Quality Improvement Plan (NPDES Submittal), inventory and review of the local hydrologist submittals, and development of a specific scope of work for the contract. The request for proposal is already drafted pending this scope of work. The projected time line for work on the City-Wide Storm Water Drainage Master Plan is to issue the Request for Proposal in April 2003 with completion of a draft document in late 2004.

### C. PROJECTED FACILITY GROWTH

*Table 7-2, Storm Drain Activities/Performance Measures*, as shown on page 37, identifies the actual activities performed and the level of service accomplished in both 1993/94 and 2001/02.

Additionally, projections in storm drain facilities growth has been calculated based on the forecast population as shown in the General Plan and recent building permit history. Incorporated in the projections are new activities and required increases in existing services needed to meet the NPDES mandate.

The 2007 projections have been included to reflect the Utility's activities/performance anticipated at the completion of the NPDES implementation phase.

A sampling of the new activities and/or required increases in existing services include:

- ▶ Increased frequency in both residential and commercial street sweeping.
- ▶ Development of public education and outreach programs and materials.
- ▶ Annual inspection and cleaning of all catch basins.
- ▶ Inventorying and mapping of all facilities.
- ▶ Condition assessment of facilities.
- ▶ Comprehensive collection and recording of all related maintenance data.
- ▶ Progress reporting on performance and effectiveness of activities.

## Section 7 - Financial Issues

**Table 7 - 2**  
**STORM DRAIN ACTIVITIES AND PERFORMANCE MEASURES**  
**1993 - 2023**

Activity/Measure	Actual		Projected		
	1993	2002	2007	2013	2023
Size of City (sq miles)	58.41	59.76	64	69*	75**
Population (2,477 per household)	76,500	84,143	91,868	99,593	121,415
Number of Employees	6	5	8	10	12
Miles of Storm Drain Pipes/Culverts	114	138	150	162	193
Percentage Inspected/Cleaned/Repaired Annually	5%	20%	100%	100%	100%
Number of Catch Basins	4,844	5,220	5,843	6,467	7,714
Percentage Inspected/Cleaned/Repaired Annually	5%	20%	100%	100%	100%
Number of Retention/Detention Basins	N/A	48	49	50	52
Number of Basins Maintained Annually	0	3	49	50	52
Miles of City Streets	390	436	485	535	637
Number of Curb Miles Swept	511	570	669	768	972
Number of Times Residential Streets are Swept Annually	24	6	24	24	24
Number of Times Commercial Streets are Swept Annually	150	52	150	150	150
Miles of Earthen Ditches and Open, Stream and Concrete Channels	144	174	188	202	219
Miles Maintained	15	18	18	20	22
Percentage Inspected/Cleaned Annually	15% -- 7	18% -- 9	18% -- 18	20% -- 20	22% -- 22
Number of Bridge Area Drains	N/A	94	94		
Percentage Inspected/Cleaned Annually		32%	94%		

**Notes:**

- \* Assume buildout of primary growth area as illustrated in General Plan
- \*\* Assume 50% buildout of secondary growth area as illustrated in General Plan

### D. STORM WATER QUALITY IMPROVEMENT PLAN (NPDES - WATER QUALITY BMPs)

The National Pollutant Discharge Elimination System (NPDES) is a system of permits required under the Federal Water Pollution Control Act to reduce or eliminate pollutant discharge to waters of the United States. Phase I of the NPDES program was implemented by the United States Environmental Protection Agency (USEPA) in 1990, requiring urban areas with populations greater than 100,000 and construction activities of five acres or more to obtain an NPDES Storm Water Permit.

In 1999, new rules governing Phase II of the NPDES program were published to cover an extensive list of smaller urban areas and construction projects of one acre or more and those construction projects on or adjacent to sensitive areas. The City of Redding was specifically listed by USEPA as a participant in Phase II.

The NPDES municipal permit for the City of Redding requires submission of an annual permit fee of \$10,000 and development of a Storm Water Quality Improvement Plan (SWQIP). Addressed in the SWQIP are the six minimum control measures as outlined by the USEPA. These measures are public education and outreach, public involvement and participation, illicit discharge detection and elimination, construction site storm water run off, post-construction storm water management and pollution prevention and good housekeeping for municipal operations. Chapter 5 of the SWQIP provides details on how the City will implement programs and/or practices to meet these six control measures, along with measurable goals, implementation time schedules and designation of resources and responsible staff.

Four out of the six minimum control measures apply to, and will have a significant financial impact on, the Storm Drain Utility. Implementation of the NPDES program will require the addition of equipment (street sweepers, backhoe, trucks), materials/supplies for the various tasks and personnel (equipment operators, data entry, maintenance workers).

Unfortunately, the exact work tasks have not yet been defined through the permit process. Therefore, an order of magnitude number is being used to estimate program costs based on discussions with other agencies, reports prepared by the American Public Works Association (APWA) and discussions with consulting firms who have prepared NPDES plans for other agencies. The number has been as low as \$ 1.39 per capita to a high of \$19.00 per capita. The average cost within this range is \$10.20 per capita. These numbers are approximately one year old.

Implementation within Redding would occur approximately two years after the numbers were developed. Therefore, an inflation factor and a contingency are applied which results in a per capita estimate of \$13.00 annually as the basis for projecting rates and financial planning. This projected figure includes all City-wide related activities necessary to implement the NPDES program.

Table 7 – 3, *Projected Storm Drain Utility and NPDES Implementation Expenditures*, shows a line item for NPDES implementation based on the estimated \$3.00 per capita cost factor. IT is understood that the NPDES full implementation will occur over a five year period as the plan is developed and work tasks are brought on line. As such, the financial assessment anticipates implementation of the full per capita fee over that period. To that end, the first year shows

20% of the fee, the second year shows 40% of the fee and so on through the five year period. At full implementation of the per capita fee, the Utility budget will have doubled. At this point in time, there is no defined revenue source included in the assessment for the NPDES work tasks and as such the 10-year financial plan indicates a substantial deficit position. For further information on the NPDES Permit and implementation schedule, refer to the Storm Water Quality Improvement Plan.

Basically, the City/Utility needs to increase revenue each year by about \$200,000 a year over the next five years to have an additional \$1,000,000 per year for operational costs. This increase does not address the capital costs associated with storm drains in the City.

**Table 7 - 3**  
**Projected Storm Drain Utility and NPDES Implementation Expenditures**  
**2003 - 2007**

	2003/04	2004/05	2005/06	2006/07	2007/08
Population	85,573	87,028	88,508	90,012	91,542
NPDES Implementation (City-wide)	\$ 222,491	\$ 452,547	\$ 690,360	\$ 936,128	\$ 1,190,052
Projected Storm Drain Expenditure Estimates	\$ 1,020,756	\$ 1,026,190	\$ 1,010,257	\$ 1,026,548	\$ 1,053,583
Total Projected	\$ 1,243,247	\$ 1,478,737	\$ 1,700,617	\$ 1,962,676	\$ 2,243,635

Note: For detailed Storm Drain Revenue/Expenditure Plan reference Appendix J(1) and J(2)

### E. FUNDING OPTIONS

This section deals with two topics:

- ▶ Funding for Operations and Maintenance
- ▶ Funding for Capital Improvements

#### Operations and Maintenance

Operations are funded entirely by the Storm Drain Utility Tax. That fee raises about 876,734 per year and covers the following in the current budget:

General and Administration	\$ 238,900
Fees	\$ 125,000
Maintenance	\$ 311,580
Street Sweeping	\$ 152,150
Debt Service	\$ 51,500
Rolling Stock Contribution	\$ 50,000
<b>Total</b>	<b>\$ 929,130</b>

Currently, the Utility is using reserves, interest and a contract with the State to balance its budget. With the NPDES requirements, the Utility will need to ramp up its budget by about \$220,000 per year for next five years to an estimated \$2,000,000 by 2008.

Options that could be considered include the following:

**City General Fund** – These are discretionary funds available to the City for non-utility-based services. Typically, these funds are used to support Police, Fire, Streets, Parks, Administrative Departments, and other projects not covered under utility-based fee structures. Availability of these funds is limited at best.

**Transfer of Duties** – Review functions currently within the Storm Drain Utility to determine if they would be more appropriately served by another utility. For instance, the underground piping system maintenance and inspection could be shifted to the Wastewater Utility. Wastewater currently maintains a piping collection system and analyzes the condition of wastewater throughout its industrial discharge work group. Shifting of such tasks into its operations plan may allow the use of Storm Drain Utility funds to continue channel maintenance, while using the Wastewater Utility funds to monitor the storm water pipe system. Another possible shift would be to transfer street sweeping and catch basin cleaning to the Solid Waste Division, using the destination and state of the materials collected as a nexus, i.e., litter abatement of streets and leaves.

**Sales Tax** – One funding option that is used for a variety of programs is a sales tax addition. Typically, the amount is one-quarter of a percent, which is then dedicated to a specified program or list of projects. This option would require a vote. To fund NPDES requirements, the City would need one-sixteenth of a cent to raise \$1,100,000.

#### **Increase Storm Drain Utility Assessment Rates**

This option would increase the assessment on each developed parcel by an amount necessary to meet the current financial requirements and the additional water quality program required under the Clean Water Act. This option is subject to Proposition 218 requirements, which specify:

- ▶ Both property owner and voter approval whereby if a majority of property owners object the voting public must approve the measure by a 2/3 majority.

## Section 7 - Financial Issues

- ▶ Revenues from the fee may not exceed the funds required to provide the property-related services.
- ▶ Revenues may not be used for any purpose other than that for which the fee was imposed.
- ▶ The amount of the fee may not exceed the proportional cost of the service attributable to the parcel.

**Inspection Fees** – NPDES requirements include inspections to determine compliance, including prohibition of illegal discharges to the municipal storm sewer system. It is possible to impose fees relative to the actual cost of compliance inspections that is based on actual effort, instead of property-related and therefore not subject to Proposition 218. This can be applied to new development inspections as well as discharge compliance.

**Developer Impact Fee** – It may be possible to adopt an expanded development fee to pay for the cost of new developments' impact on the City's storm water management system based on NPDES requirements. A study would need to be conducted to determine whether the findings required under the Mitigation Fee Act can be made. In any event, in order to minimize rate increases, the City would need to raise development fees to cover all future capital costs not associated with maintenance.

**CEQA Review Fee** – All projects subject to CEQA review must perform an analysis of whether the project will have an impact on "any water quality standards or waste discharge requirements." Because of the new NPDES water quality requirements, project review workload will increase on the Planning and Building permit staff. Adequate fees relative to the cost of providing review of

water quality issues and ongoing mitigation monitoring would be appropriate.

**Assembly Constitutional Amendment** – On February 11, 2003, Assembly Constitutional Amendment ACA 10 was introduced, proposing that storm-drain utilities be included in the list of utilities exempt from Proposition 218 requirements. If passed, this amendment would allow increasing the current storm-drain utility fee without requiring a 2/3 majority vote.

**City General Fund** - These are discretionary funds available to the City for non-utility based services. Typically, these funds are used to support Police, Fire, Streets, Parks and overall Administrative departments of the City. Competition for these funds is high, and it is unlikely that they would be available for Storm Water Utility needs.

**Maintenance Districts** – Facilities serving new development may be included in a facilities maintenance district. However, limitations exist on the use of such districts pursuant to Proposition 218.

**Combination of the Above** – In reality, it will take a combination of the above along with carefully managing new requirements to address funding for operations and maintenance.

### Capital Costs

Capital costs include two areas:

- ▶ Replacement and Repair of Existing Facilities
- ▶ System Expansion and Increase Carrying Capacity or Detention to Relieve Flows

## Section 7 - Financial Issues

**Replacement and Repair** – These should be funded by the Storm Drain Utility to repair and replace failed, damaged, and undersized storm drains. Also, included in this category would be the conversion of an open channel to an enclosed drain. Currently, these are not funded by Storm Drain fees.

**System Expansion and Increase Carrying Capacity** – These occur as a result of new growth, more impervious surfaces, and to prevent flooding. Developers and new development fees would be expected to pay for these improvements, but the question is the timing of the projects, collecting from multiple owners, and the risk of flooding until improvements are made and absolute funding is available. The Storm Drain Master Plan details these improvements.

In June 1993, the City adopted a Storm Water Master Plan based on the prior General Plan. A revised General Plan was adopted in 2000 which made minor adjustments to the City's long-term land use plan. Consideration has been given to doing a new master storm drain plan with a change of focus from conveying and passing storm water to doing retention in core basins. This has been on hold due to lack of staff, competing projects and monitoring the work and issues associated with the detention project on Clover Creek.

The 1993 Storm Drain Master Plan identified a total of \$22.7 million needed for storm drain improvements in the City. Projects were divided into five phases, with an average of \$3 million each, totaling about \$15.2 million in 1993 dollars. In 2003, the estimated cost of these same improvements is \$24.76 million. A sixth phase was identified for the Downtown Area with a cost of about \$7.5 million, but was not recommended to be funded during the plan.

The Storm Drain Master Plan did not include a time frame for funding capital improvements. At the current rate of funding, \$350,000 per year, it will take 71 years to pay for the improvements. Currently, storm drain utility fees do not provide funding for capital improvements. Depending upon the rate of construction, existing storm drain fees will generate about \$3.5 million over the next ten years in 2003 dollars.

### F. LONG TERM FORECAST

Following are two separate ten-year financial plans. The first, Table 7-4, is the existing financial plan without NPDES folded in. It shows the Utility operating using up reserves and going into the red by 2007/08. Due to recent cost increases not yet reflected in the ten-year financial plan, this will likely occur sooner unless changes are made. Note this plan does not show any replacement of existing facilities by using utility rates. Any and all capital costs are funded by the development fees, including master planning.

The second ten-year financial plan, Table 7-5, folds in the NPDES Phase 2 requirements. The net effect of this is to make things about ten times worse at the end of ten years. This plan ramps up the Phase 2 requirements over the first five years. There are not any fees for capital improvements other than by the Storm Drain Construction Tax.



## Section 8

# Summary of Maintenance and Operations Recommendations

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The recommended operations and maintenance plan has been developed to quantify and qualify the size of the overall storm drainage system within the City of Redding and the various management practices that have been or will be implemented to maintain the system. The plan also verifies that the City of Redding does not provide a uniform maintenance level in all portions of the system. Attention is directed to those sections of the system which may impact developed properties as a result of flooding.

It is intended that this Plan is a working document and adjusted as needed to reflect changing conditions. It is the goal of the document to provide stable funding and a businesslike approach to the operation of the Utility. It is a document which will be modified as the system grows, maintenance practices change and documentation as to what is a City maintained facility is verified. In summary, the plan includes the following recommendations:

- ▶ Implementation of a comprehensive reporting and tracking system to facilitate the scheduling and tracking of storm drain maintenance, provide inventory controls, and financial implications for budget development.
- ▶ Purchase and use of an operations management software program to efficiently manage the City's storm drain assets and effectively capture work order and maintenance data.
- ▶ Establish a program to confirm drainage system information through field surveys in

order to validate inventory and improve accuracy of mapping.

- ▶ Research easement data to verify ownership of property associated with storm drain facilities.
- ▶ Increase the frequency of street sweeping on residential streets from once every two months to once per month.
- ▶ Establishment of an annual inspection of storm drain facilities which include: streams, channels, catch basins, detention /retention basins, culverts/pipes, roadside ditches and bridge area drains.
- ▶ Establishment of a greater Administrative process to coordinate reports, monitor work efforts, and expand community education related to the storm drain system.
- ▶ Development of realistic revenue projections and sources to meet the needs of the Storm Drain Utility.

The above work tasks are in addition to the work currently being done by the Storm Drain Utility in a "fire fighting mode." As such, additional revenue will be required to meet the needs of a growing community, an aging system and new federal mandates under the NPDES program. It is this challenge which will shape the Storm Drain Utility in years to come and which mandate the need for the implementation of this Maintenance and Operation Plan.

# **APPENDIX A**

## **Storm Drain Utility Ordinance**

ORDINANCE 2061

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF REDDING AMENDING  
TITLE 14 OF THE REDDING MUNICIPAL CODE BY ADDING A NEW CHAPTER 14.18  
ENTITLED STORM DRAINAGE UTILITY.

The City Council of the City of Redding does hereby ordain as follows:

Section 1. Title 14, Utilities, of the Redding Municipal Code is hereby  
amended by adding a new Chapter 14.18, Storm Drainage Utility, as follows:

**Chapter 14.18  
STORM DRAINAGE UTILITY**

Sections:

- 14.18.010 Purpose
  - 14.18.020 Definitions
  - 14.18.030 Organization of Storm Drainage Utility Division
  - 14.18.040 Storm Drainage Utility Division Functions
  - 14.18.050 Rules and Regulations
  - 14.18.060 Erosion, Siltation, and Sedimentation
  - 14.18.070 Prohibited Discharges
  - 14.18.080 Compliance by Industrial Users with Federal and State Standards
  - 14.18.090 Multiple Fund Projects
  - 14.18.100 Flood Control Structures
  - 14.18.110 Private Facilities
  - 14.18.120 Public Facilities
  - 14.18.130 Ancillary Improvements
  - 14.18.140 Routine and Remedial Maintenance
  - 14.18.150 Emergency Situations
  - 14.18.160 Land and Facilities Affected Outside the City
  - 14.18.170 National Flood Insurance Program
  - 14.18.180 Flooding, Liability
  - 14.18.190 Master Plan
  - 14.18.200 Encroachment Permits and Plan Review
  - 14.18.210 Construction of Storm Drains
  - 14.18.220 Right of Entry for Survey and Examination
  - 14.18.230 Inspection and Surveillance
  - 14.18.240 Notice of Violations
  - 14.18.250 Establishment of Connection Charges and Service Rates
  - 14.18.260 Rates - Standards
  - 14.18.270 Funding
  - 14.18.280 Storm Drainage Fund
  - 14.18.290 Storm Drainage Service Charge
  - 14.18.300 Classification of Property User Groups
- OF 2061

- 14.18.310 Land Use Impervious Acreage Factor (IA)
- 14.18.320 Monthly Service Charge
- 14.18.330 Billing and Collection
- 14.18.340 Board of Appeals.

#### 14.18.010 Purpose

- A. The purpose of the Storm Drainage Utility Division is to:
  - \* provide for the effective management and financing of a Storm Drainage System within the City;
  - \* provide a mechanism for mitigating the damaging effects of uncontrolled and unplanned stormwater runoff;
  - \* improve the public health, safety, and welfare by providing for the safe and efficient capture and conveyance of stormwater runoff and the correction of stormwater problems;
  - \* authorize the establishment and implementation of a master plan for storm drainage, including design, coordination, construction, management, operation, maintenance, inspection, and enforcement;
  - \* establish reasonable storm drainage service charges based upon each property's contribution of stormwater runoff to the system and use and benefit of services and facilities; and
  - \* encourage and facilitate urban water resources management techniques, including detention of stormwater runoff, minimization of the need to construct storm drains, and the enhancement of the environment.
- B. In order to accomplish such purpose, a storm drainage service charge shall be made on each developed lot or parcel in the City. Each property's contribution to runoff shall be the primary consideration in setting the service charge.
- C. The City's storm drainage service charges shall be fair and reasonable and bear a substantial relationship to the cost of providing service and facilities. Similar properties shall pay similar storm drainage service charges. Charges shall reflect the net impervious acreage of each property. Rate studies to assist in establishing charges shall be conducted.

#### 14.18.020 Definitions

- A. For the purpose of this chapter, the words and phrases shall be defined as follows, unless the context clearly indicates or requires a different meaning:
  - 1. "Approved Plans" shall mean plans approved under the City of Redding Municipal Code.
  - 2. "Building Department" shall mean the Building Department of the City of Redding.
  - 3. "City" shall mean the City of Redding, California.

4. "City Manager" shall mean the City Manager of the City of Redding.
5. "Council" shall mean the Council of the City of Redding.
6. "County" shall mean the County of Shasta, California.
7. "Director" shall mean the Director of Public Works of the City of Redding.
8. "Developer" shall mean a person, firm, partnership, corporation, or other entity that excavates, fills, builds structures, or otherwise improves or changes a specific parcel or tract of land.
9. "Drainage Code" shall mean the "Storm Drainage Utility Code" of the City of Redding as contained in Chapter 14.18 of the Redding Municipal Code.
10. "Erosion Control Plan" shall mean a plan required by an ordinance, rule, or regulation for controlling the movement of soils due to storm runoff created by construction activities.
11. "Existing" shall mean present or in effect as of the time of the adoption of this chapter.
12. "Facilities" shall mean various drainage works that may include inlets, conduits, manholes, energy dissipation structures, channels, ditches, pipelines, outlets, retention/detention basins, and other structural components.
13. "Impervious Acreage Factor" (IAF) shall mean a factor for each land use which, when multiplied by a parcel's actual acreage, derives the estimated impervious surface of that parcel of real property.
14. "Impervious Surface" shall mean surfaces on or in a lot or parcel of real property which reduce the rate of infiltration of stormwater into the earth. Examples of impervious surfaces include asphalt paving, roofs, and concrete walkways.
15. "Mobile Home Park" means any or tract of land containing one or more mobile home lots.
16. "Multi-Family Residential" shall mean a common-wall dwelling, with kitchen and bathroom(s) intended for permanent private occupancy by one or more persons or a single family, for living and sleeping purposes.
17. "National Flood Insurance Program" shall mean the federal program to provide subsidized insurance for flood damage to properties in flood plains. The program includes a number of regulations restricting what can be done in a flood plain.
18. "Notice" shall mean a written or printed communication conveying information or warning.

19. "Open Space" land use shall be defined as land use classifications, Parks and Golf, Agriculture, Greenway, Recreation, and Undesignated.
20. "Order" shall mean the whole or any part of the final disposition (whether affirmative, negative, injunctive, or declaratory in form) or any matter issued by the Utility Engineer or City Manager or person designated by them pursuant to any provision of this chapter.
21. "Premises" shall mean the lot or parcel and the buildings situated thereon.
22. "Private" shall mean that property or facilities owned by individuals, corporations, and other organizations, and not by city, state, or federal governments.
23. "Public" shall mean that property or facilities owned by city, state, or federal governments.
24. "Residential Dwelling Unit" shall mean a living space in either a single-family (detached) or a multi-family (common-wall) dwelling, with kitchen and bathroom(s) intended for permanent private occupancy by one or more persons or a single family, for living and sleeping purposes.
25. "Risk Manager" shall mean the Risk Manager for the City of Redding.
26. "Single-Family Residential" shall mean a detached living space, with kitchen and bathroom(s) intended for permanent private occupancy by one or more persons or a single family, for living and sleeping purposes.
27. "Storm Drain" shall mean a drain which carries stormwater, surface runoff, street washwaters, and drainage, but which excludes sanitary sewage and industrial wastes.
28. "Storm Drainage System" shall mean all facilities, structures, and natural watercourses used for collecting and conducting stormwater to, through, and from drainage areas to the points of final outlet, including but not limited to any and all of the following: inlets, conduits and appurtenant features, canals, creeks, channels, catch basins, ditches, streams, gulches, gullies, flumes, culverts, siphons, retention or detention basins, dams, floodwalls, levees, and pumping stations.
29. "Storm Drainage Utility Code" shall mean Chapter 14.18 of the Redding Municipal Code.
30. "Storm Drainage Utility Division" shall mean the Storm Drainage Utility Division of the Department of Public Works of the City of Redding.
31. "Street Cleaning" shall mean the regular, periodic, removal of silts, leaves, pollutants, and other debris from the public streets of the City of Redding.

- 32. "Undeveloped Land" shall mean a parcel of land that is without any building, structure, or improvement.
- 33. "Utility Engineer" shall mean the City Engineer or his/her representative designated to administer the functions of the Storm Drainage Utility Division.

#### **14.18.030 Organization of Storm Drainage Utility Division**

The Storm Drainage Utility Division shall have the responsibility for operating existing and new stormwater facilities; implementing and enforcing the provisions of this chapter; and other related duties as directed by the City Manager.

#### **14.18.040 Storm Drainage Utility Division Functions**

- A. The Storm Drainage Utility Division shall be responsible for the planning, design, and construction of the public storm drainage system in the City and shall inspect, operate, and maintain them. For the purpose of this chapter, storm drainage system is as defined in the definitions.
- B. Street cleaning shall be performed by the Storm Drainage Utility Division to reduce chemicals, hazardous materials, debris, and other pollutants from entering the storm drainage system.
- C. The Storm Drainage Utility Division shall be responsible for public information designed to educate and inform the general public on the need to reduce surface pollution.
- D. The Storm Drainage Utility Division shall be responsible for monitoring all state and federal regulations relating to storm drainage management and surface pollution reduction.

#### **14.18.050 Rules and Regulations**

In order to accomplish the purpose of this chapter to protect the drainage facilities, improvements, and properties owned by the City; secure the best results from the construction, operation, and maintenance thereof; and prevent damage and misuse of any of the drainage facilities, improvements, or properties within the City, the Utility Engineer may make and enforce rules and regulations that are approved by the City Council, and are necessary and reasonable:

- A. To prescribe the manner in which storm drains, ditches, channels, and other stormwater facilities are to be designed, installed, adjusted, used, altered, or otherwise changed.
- B. To prescribe inspection and other fees permitted by this chapter.
- C. To prescribe the manner in which such facilities are operated.
- D. To facilitate the enforcement of this chapter.

- E. To prescribe the collection procedures and timing of service charge bills.
- F. To protect the drainage facilities, improvements, and properties controlled by the Storm Drainage Utility Division, and to prescribe the manner of their use by any public or private person, firm, or corporation.
- G. To protect the public health, safety, and welfare.

**14.18.060 Erosion, Siltation, and Sedimentation**

- A. The Storm Drainage Utility Division shall be responsible for controlling erosion, siltation, and sedimentation that will adversely affect storm drains, drainage ditches, watercourses, and other drainage facilities after the improvements have been constructed and are accepted for maintenance and operation.
- B. The Storm Drainage Utility Division shall not be responsible for erosion, siltation, and sedimentation for projects of other governmental agencies having erosion control plans unless the agencies do not fulfill their surveillance and enforcement policies.

**14.18.070 Prohibited Discharges**

- A. The willful or negligent disposal of petroleum products (oil and grease), pesticides, fertilizers, household or industrial chemicals, industrial process wastewater, domestic sewage, animal waste, or other pollutants onto private or public property or into the Storm Drainage System is prohibited.

**14.18.080 Compliance by Industrial Users with Federal and State Standards**

- A. All industrial activities shall comply with the strictest of any applicable federal or state standards or regulations covering the discharge of stormwater or surface water, including but not limited to those adopted pursuant to the Clean Water Act, PL 95-217, as amended, and the National Pollutant Discharge Elimination System (NPDES).
- B. Any industrial activity not complying with the standards or regulations as required by subsection thereof may be required by the Director to develop and implement a compliance schedule for any measures or facilities as may be necessary to meet said standards and regulations.
- C. Industrial activities required to obtain NPDES permits regulating the discharge of stormwater and surface water to the City's Storm Drainage Systems shall notify the Director that they are subject to such permit. Notice shall be made in writing within thirty (30) days before such activity commences. The NPDES permit holders shall notify the Director immediately by telephone upon discovery of any discharge in violation of their permit.



- D. The Director or a representative shall have access to the site of the industrial activity regulated by a NPDES industrial stormwater permit, for purposes of inspection and monitoring, upon notice to the designated representative of the NPDES permit holder.

#### **14.18.090 Multiple Fund Projects**

Where a public improvement is funded by the City and other agencies or organizations, and storm drainage is not a primary part of that project, the Storm Drainage Utility Division's responsibility for the storm drainage costs shall be in proportion to the City's share of the total cost of the project, unless otherwise agreed.

#### **14.18.100 Flood Control Structures**

The maintenance of pump stations which are built as a part of the City's storm drain system shall be a function of the Storm Drainage Utility Division.

#### **14.18.110 Private Facilities**

- A. The owner shall be responsible for stormwater drainage facilities located on their private property where runoff will principally be collected within that property. The owner shall clean and maintain the facility or channel as required to ensure proper operation consistent with the Rules and Regulations of the Storm Drainage Utility Division.
- B. Where public facilities are in easements, the owner of the property is responsible for aesthetic maintenance such as lawn mowing, litter pickup, etc. The owner shall place no structures or plantings that interfere with the drainage facility or its operation and maintenance. The owner shall not deposit any clippings, debris, or other material in the storm drain system, either public or private.

#### **14.18.120 Public Facilities**

The Storm Drainage Utility Division shall be responsible for the inspection, maintenance, and operation of drainage facilities on all streets, boulevards, alleys, viaducts, sidewalks, curbing, street crossings, grade separations, and other public ways and easements, and highway structures and appurtenances belonging to the City, and all drains, ditches, culverts, canals, streams, levees, tunnels, and appurtenances thereof.

#### **14.18.130 Ancillary Improvements**

The Utility Engineer may authorize the construction of curbs, pavements, channels, watercourses, conduits, culverts, or other structures necessary to properly operate and maintain stormwater facilities.

#### **14.18.140 Routine and Remedial Maintenance**

The Utility Engineer shall provide for inspection and routine maintenance of facilities under the control of the Storm Drainage Utility Division. In addition to street sweeping, maintenance may include catch basin cleaning, grating and casting repair, inlet and outlet structure repair, bridge surface drainage systems cleaning, channel clearing, erosion repair, and other incidentals. The Utility Engineer shall provide for remedial maintenance of facilities based on the severity of the problem and potential hazard to the public. Remedial maintenance of bridge surface drainage systems and state highway drainage facilities shall remain the responsibility of agencies other than the Storm Drainage Utility Division.

#### **14.18.150 Emergency Situations**

Nothing in this chapter shall be construed to prevent immediate action by the Director in emergency situations.

#### **14.18.160 Land and Facilities Affected Outside the City**

Where stormwater drains from lands outside the City, facilities within the City shall be designed in accordance with this chapter as if the entire drainage area was within the City.

#### **14.18.170 National Flood Insurance Program**

- A. The Storm Drainage Utility Division shall assist the Planning Department in the administration of the National Flood Insurance Program.
- B. The Storm Drainage Utility Division shall assist the Planning Department and the Land Development Division of Public Works in the review of detailed site plans submitted with applications for permits for development in areas of special flood hazard. The review shall be based on the Flood Insurance Study and the Floodway Boundary and Floodway Map furnished by the Federal Emergency Management Agency. The Storm Drainage Utility Division shall provide the Planning Department with such information as required. It will assist in appeals, public information, map reviews, flood profile determinations, and other calculations and consultations required in the administration of the program.

#### **14.18.180 Flooding, Liability**

Floods from stormwater runoff may occasionally occur which exceed the capacity of Storm Drainage Systems constructed, operated, or maintained by funds made available under this chapter. This chapter does not imply that property subject to the fees and charges established herein will always be free from stormwater flooding or flood damage, or that Storm Drainage Systems capable of handling all storm events can be cost-effectively constructed, operated, or maintained. Nor shall this chapter create a liability on the part of, or cause of action against, the City or any officer or employee thereof for any flood

damage that may result from such storms or the runoff thereof. Nor does this chapter purport to reduce the need or the necessity for obtaining flood insurance.

#### 14.18.190 Master Plan

The Utility Engineer shall establish and maintain a master plan for a Storm Drainage System to handle the stormwater runoff.

#### 14.18.200 Encroachment Permits and Plan Review

- A. It shall be unlawful for any person or organization to construct, enlarge, alter, repair, relocate, or demolish a storm drain, natural watercourse, or other drainage facility, without first filing an application and obtaining an encroachment permit from the Department of Public Works. An application shall be made by the owner of the property involved, or an authorized agent employed in connection with the proposed work. Permits for minor repairs, as defined in Section 14.18.050 of the Rules and Regulations, shall not be required. Minor repairs are that work that merely restores a facility to its former function and has no potential to disrupt the functioning of that facility or to cause increased erosion or other negative impact on the public or the environment.
- B. Encroachment permits are required and may be granted by the Department of Public Works for the following improvement categories:
  - 1. Connection into the public Storm Drainage System, except unimproved creeks or streams.
  - 2. Improvements which are or will become public facilities owned and maintained by the City.
  - 3. Improvements within dedicated but unimproved street rights-of-way.
  - 4. Improvements which are, or will be, public retention or detention facilities.
- C. Connection into a Storm Drainage System shall be performed only by contractors who meet the following requirements:
  - 1. They shall have the appropriate license issued by the City, County or State; and
  - 2. They have posted a bond with the City in the amount determined by the Department of Public Works; and
  - 3. They provide insurance as required by the City's Risk Manager.

#### **14.18.210 Construction of Storm Drains**

In appropriate circumstances as determined by the City, where private developers construct a main storm drain pipeline at the City's requirement greater in size than is needed for the private developer's own development, the City may contribute to the cost of such oversizing or increased depth.

Where the City's master storm drain plan requires a storm drain pipeline to be constructed greater in size than required for the applicant's development, the City shall assume the incremental cost of oversizing the storm drain to satisfy the master storm drain plan. The City will pay the invoice pipe price difference between the size needed for the development and the size recommended in the master storm drain plan, plus fifteen percent, provided an agreement is entered into with the City prior to commencement of work and when funds are available. All agreements and/or contracts shall be approved by the City Council before work commences.

#### **14.18.220 Right of Entry for Survey and Examination**

- A. After presenting proper credentials and securing permission, the employees of the Storm Drainage Utility Division or its agents, including contractors and their employees, consultants and their employees, may enter upon lands within the City to make surveys and examinations to accomplish the necessary preliminary findings to establish a master plan and for detailed analysis to prepare final plans and specifications for the proposed improvements.
- B. Where improvements are constructed and accepted that require periodic maintenance or inspection upon the lands by the Storm Drainage Utility Division, the owner of such lands shall grant the City a perpetual easement and right-of-entry around and access to any Storm Drainage System.

#### **14.18.230 Inspection and Surveillance**

The Utility Engineer shall inspect premises and enforce all laws relating to construction, alteration, repair, removal, demolition, equipment, use, location, and maintenance of the Storm Drainage System except as may be otherwise provided for.

#### **14.18.240 Notice of Violations**

When the Utility Engineer finds the Storm Drainage System or the construction thereof is contrary to the approved plans or presents an unsafe or dangerous condition in connection with the provisions of this chapter or of any law or ordinance relating to the same subject matter, the Utility Engineer shall give notice to the owner of the premises.

#### 14.18.250 Establishment of Connection Charges and Service Rates

The City Council may from time-to-time, at its discretion and by resolution, fix, alter, change, amend, or revise all connection charges and service rates in connection with the storm drainage system.

#### 14.18.260 Rates - Standards

In fixing and establishing storm drainage rates for service within the corporate limits of the City, the City Council shall be guided by and must conform to and abide by the provisions of this section. Storm drainage rates shall be sufficient to produce sufficient revenue to pay all the costs of operation and maintenance of the storm drainage utility division and the storm drainage system, and to discharge and pay all costs in connection with the additions and betterments to the storm drainage system, and to discharge and pay all cost of depreciation and obsolescence of the storm drainage system, and to discharge and pay the bonded indebtedness, including the principal and interest amounts thereof, incurred by the City to construct the storm drainage system, and to establish and maintain a reserve fund.

#### 14.18.270 Funding

Funding for Storm Drainage Utility Division activities may include, but shall not be limited to:

- A. Storm drainage service charge.
- B. Permit and inspection fees.
- C. Direct charges. This charge will be collected from the owner(s) and developer(s) for the cost of designing and constructing Storm Drainage Systems and administrative costs and related expenses where the Storm Drainage Utility Division designs and/or constructs or contracts for the construction of such systems.
- D. Development fees. This charge will be based on the interior square footage of new development or renovations for the purpose of providing funds for the improvement of the Storm Drainage System.
- E. Direct assessment. This charge will be collected from owners in localized areas that desire Storm Drainage Systems not considered a part of the regional development or where an improvement is desired ahead of the priority status.
- F. Construction tax - storm drain element. All construction currently pays a storm drainage element charge of ten cents per square foot of ground floor construction. Mobile home parks or mobile homes on individual lots shall pay one hundred dollars per mobile home lot. This tax is expected to continue.
- G. Other income obtained from federal, state, local, and private grants, or revolving funds.

#### **14.18.280 Storm Drainage Fund**

All revenues generated by or on behalf of the Storm Drainage Utility Division, including storm drainage service charges, permit and inspection fees, and direct charges and interest earnings on those revenues, shall be deposited in a storm drainage fund and used exclusively for Storm Drainage Utility Division purposes.

#### **14.18.290 Storm Drainage Service Charge**

A storm drainage service charge is imposed on each developed lot and parcel of land within the City, and the owner thereof, excepting therefrom streets, arterials, alleys, viaducts, sidewalks, curbing, street crossings, grade separations, other public ways and easements, and highway structures and appurtenances belonging to the City. Charges and fees set forth in this chapter shall be adopted by resolution of the City Council.

- A. Undeveloped land and open space shall be exempted from storm drainage service charges.
- B. Road and freeway rights-of-way shall be exempted from the storm drainage service charge because they function as part of the Storm Drainage System.
- C. In all cases where a parcel has several tenants, the city contracts only with the owner of the property or his authorized agent(s). In cases where the parcel has multiple use classifications, as listed in Chapter 14.18.300, the use classification with the higher impervious acreage factor, listed in Chapter 14.18.310, will be used to calculate the service charge.

#### **14.18.300 Classification of Property User Groups**

There shall be the following classifications based on use of property for determination of the storm drainage service charge:

- A. Commercial:
  - 1. Industrial, service commercial, retail, and highway commercial
  - 2. Office, office residential, airport service
  - 3. Mobile home parks
- B. Public or institutional
- C. Residential:
  - 1. Single-family residential
  - 2. Multi-family residential.

#### **14.18.310 Land Use Impervious Acreage Factor (IAF)**

Land uses are identified and recognized for purposes of this chapter, each of which has an assigned impervious acreage factor (IAF). The land use of each property shall be assigned based on the records of the County Recorder or

Auditor, the City, or through field examination or photogrammetric analysis.

**IMPERVIOUS ACREAGE FACTOR**  
(based on parcel area)

- A. Commercial
  - 1. Industrial, service commercial, hotel, retail, and highway commercial . . . . . 0.950
  - 2. Office, office residential, motel, and airport service . . 0.800
- B. Public or Institutional. . . . . 0.700

**14.18.320 Monthly Service Charge**

- A. The total impervious acreage for all developed parcels shall be calculated using the IAF for each, or actual measurements, or any other approved methods.
- B. The annual revenue requirement of the Storm Drainage Utility Division will then be allocated to developed residential and nonresidential lands in proportion to their total impervious acreage to determine an annual revenue requirement per impervious acre.
- C. The monthly revenue requirement per impervious acre will be the allocated annual revenue requirement per impervious acre divided by twelve.
- D. The monthly service charge for Commercial and Public or Institutional land use classifications shall be calculated based on the total impervious acreage for the developed parcels using the IAF for each, or actual measurements, or any other approved methods, times the monthly revenue requirement per impervious acre.
- E. The monthly service charge for Single-Family Residential shall be based on the estimated impervious area of .08 Acres per unit for that land use classification times the monthly revenue requirement per impervious acre.
- F. The monthly service charge for Multi-Family Residential shall be based on the estimated impervious area of .05 Acres per unit for that land use classification times the monthly revenue requirement per impervious acre.

**14.18.330 Billing and Collection**

Billing, collection, and imposing of monthly service charges shall be as directed by the City Council.

**14.18.340 Board of Appeals**

- A. A board consisting of the Director, the Utility Engineer, and the City Attorney, or representatives appointed by them, shall serve as the Board of Appeals to hear and determine any appeal filed with the Storm Drainage Utility Division.

- B. The City Council shall have full authority to affirm, modify, reverse, or set aside the interpretation, ruling, or order appealed from, or to grant a variance, and its decision shall be final.

Section 2. If any subsection, sentence, clause, phrase, or portion of this chapter is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this chapter. The City Council of this City hereby declares that it would have adopted this ordinance/chapter, and each subsection, sentence, clause, phrase, or portion thereof, irrespective of the fact that any one or more subsections, sentences, clauses, phrases, or portions be declared invalid or unconstitutional.

Section 3. The City Council has found that this matter is statutorily exempt pursuant to Section 15273 of the California Environmental Quality Act Guidelines.

Section 4. This Ordinance shall go into effect and be in full force and operation from and after 30 days after its final passage and adoption.

Section 5. The City Clerk shall certify to the adoption of this Ordinance and cause its publication according to law.

I **HEREBY CERTIFY** that the foregoing Ordinance was introduced and read at a regular meeting of the City Council on the 21st day of September, 1993, and was duly read and adopted on the 5th day of October, 1993, at a regular meeting of the City Council by the following vote:

**AYES:** COUNCIL MEMBERS: Dahl, Moss and Arness

**NOES:** COUNCIL MEMBERS: Anderson and Kehoe

**ABSENT:** COUNCIL MEMBERS: None

**ABSTAIN:** COUNCIL MEMBERS: None

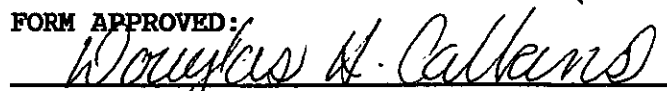


CARL ARNESS, Mayor  
City of Redding

**ATTEST:**

  
CONNIE STROHMAYER, City Clerk

**FORM APPROVED:**

  
RANDALL A. HAYS, City Attorney



# **APPENDIX B**

## **Performance Standards**



**STORM WATER UTILITY  
OPERATIONS AND MAINTENANCE MANUAL  
PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  10-00	<b>NAME</b>  INSPECT CHANNELS AND DITCHES	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Inspect channels and ditches for proper cross-section, sedimentation, debris, vegetation, potential illicit discharges, and erosion damage in order to schedule cleaning or repairs as needed.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Easements/right-of-ways still to be determined
<b>PERFORMANCE CRITERIA</b>  Perform complete inspection of channels and ditches on an annual basis and as necessary after major storm events.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> 1 Working Supervisor <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Setup proper traffic control devices. 3. Visually inspect channels for cross-section, sediment, debris, erosion, and unwanted vegetation that may prevent storm water from properly flowing. 4. Remove traffic control devices and move onto next location. 5. Document findings for preparation of a prioritization list. 6. Notify Water Quality officer/inspector of any potential illicit discharge for investigation. 7. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input type="checkbox"/> 1 Pickup <input type="checkbox"/> Necessary Measuring devices <input type="checkbox"/> Necessary Traffic Control Devices <input type="checkbox"/>	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> Notebook, maps, previous inspection sheets, pens, pencils, measuring devices <input type="checkbox"/>	8 miles per day
<b>NOTES:</b>	



## STORM WATER UTILITY OPERATIONS AND MAINTENANCE MANUAL PERFORMANCE STANDARD

<b>ACTIVITY NUMBER</b>  15-00	<b>NAME</b>  CLEAN CHANNELS AND DITCHES	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Removal of slit, debris, trash, and overgrown vegetation to maintain flood control capacity and/or for the improvement of water quality.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Sensitivity, easements and right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  Perform necessary work on an annual basis and as deemed necessary. Additional cleaning may be required after major storm events. Adhere to established maintenance criteria specific to each channel/ditch type as designated by the "A-E" rating system attached.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> .5 Working Supervisor <input type="checkbox"/> 1 Heavy Equipment Operator <input type="checkbox"/> 2 Maintenance Workers <input type="checkbox"/> 3.5 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Setup proper traffic control devices. 3. Clean channels/ditches in accordance with maintenance criteria specific to each channel/ditch type as designated by the "A-E" rating system attached. 4. Remove traffic control devices and move onto next location. 5. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input type="checkbox"/> 1 Pickup <input type="checkbox"/> 1 Dump Truck and Backhoe <input type="checkbox"/> Necessary Traffic Control Devices <input type="checkbox"/> Bull-Dozer only as permitted by Supervisor	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	750-1250 linear feet per day
<b>NOTE::</b> All work in channels needs to be performed at a time of year and in such a manner as to avoid contributing to sediment loading of storm water runoff.	All materials removed will be disposed of properly at a designated site.



# **STORM DRAIN UTILITY OPERATIONS AND MAINTENANCE MANUAL PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  20-00	<b>NAME</b>  INSPECT AND CLEAN DETENTION/RETENTION BASINS	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Inspection and removal, mechanically (including hauling and disposal), of sediment and debris deposited in basin to restore full capacity and original shape.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Easements and Right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  Inspection is performed annually to check for flooding, trash, excessive silt build-up, unpleasant odors and signs of pollution. Maintenance will include removal of trash and debris, mowing, and removal of blockages from outlet structures. Remove sediment bi-annually or when basin capacity is significantly reduced. Clean out is normally justified when the sedimentation reaches 1-2 feet in depth or as established by design.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> .5 Working Supervisor <input type="checkbox"/> 2 Heavy Equipment Operator <input type="checkbox"/> 1 Maintenance Workers  <input checked="" type="checkbox"/> 3.5 TOTAL	1. A.M. Inspect of equipment, check fuel and oil levels, proceed to work site location. 2. Notify Water Quality officer/inspector of any potential illicit discharge for investigation. Reschedule maintenance following investigation. 3. Setup proper traffic control devices. 4. Prepare removal and disposal sites for access. Stock pile materials for removal, load material and haul to designated disposal site. Shape basin to desired line and grade. 5. Grade disposal site as necessary. 6. Remove traffic control devices and move onto next location. 7. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input type="checkbox"/> 1 Pickup <input type="checkbox"/> 1 Dump Truck and Backhoe <input type="checkbox"/> Necessary Traffic Control Devices <input type="checkbox"/> Bull-Dozer only as permitted by Supervisor	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> Disposal Fees <input type="checkbox"/>	2-5 basin per day
<b>NOTES:</b>	



# **STORM DRAIN UTILITY OPERATIONS AND MAINTENANCE MANUAL PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  25-00	<b>NAME</b>  INSPECT AND CLEAN ROADSIDE DITCHES	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Inspect for potential illicit or non-storm water discharge, structural integrity and property functioning. Clean the roadside ditches to remove silt and debris.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Easements and right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  Plan for structures to be inspected and cleaned a minimum of once per year. Annual cleaning shall be the major effort to allow thorough inspection of structure in order to schedule repairs.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input checked="" type="checkbox"/> .5 Working Supervisor ( 1/2 time) <input checked="" type="checkbox"/> 1 Equipment Operator <input checked="" type="checkbox"/> 2 Maintenance Worker <input checked="" type="checkbox"/> 3.5 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Notify Water Quality officer/inspector of any potential illicit or non-storm water discharges and reschedule maintenance. 3. Setup proper traffic control devices. 4. Inspect structure visually to determine if further cleaning or repair is necessary. 5. Remove and dispose of debris at a designated dump site. 6. Remove traffic control devices and move onto next location. 7. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input checked="" type="checkbox"/> 1 Backhoe and trailer <input checked="" type="checkbox"/> Appropriate Hand Tools	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input checked="" type="checkbox"/> Pipe and clamps <input checked="" type="checkbox"/> Base rock <input type="checkbox"/> <input type="checkbox"/>	2,000 linear feet per day
<b>NOTES:</b> Dispose of debris at a designated dump site only. Structures that cannot be cleaned shall be reported to the street supervisor for initiation of corrective action.	



**STORM DRAIN UTILITY  
OPERATIONS AND MAINTENANCE MANUAL  
PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>	<b>NAME</b>	<b>DATE</b>
<b>30-00</b>	<b>INSPECT, CLEAN AND REPAIR CATCH BASINS/INLET STRUCTURES</b>	<b>12/01/02</b>
<b>DESCRIPTION &amp; PURPOSE</b> Inspect, clean and repair catch basins, inlets, sumps, grates, outflow and other structures to remove silt and debris. Inspect for structural integrity, proper functioning, and to restore elements to their original operational condition.		
<b>AUTHORIZED BY</b> Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>
<b>PERFORMANCE CRITERIA</b> Plan for structures to be inspected once per year for deterioration, need for cleaning and potential illicit or non-storm water discharges. Schedule cleaning and repair as warranted. Plan minor repair of two percent (2%) of system structures per year if possible.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> 1 Working Supervisor (Inspection/assessment) <input type="checkbox"/> 1 Equipment Operator <input type="checkbox"/> 1 Maintenance Worker  <input type="checkbox"/> 3 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Notify Water Quality officer/inspector of any potential illicit or non-storm water discharge and reschedule maintenance. 3. Setup proper traffic control devices. 4. Locate truck in the best working position and as far off the roadway as practical. 5. Remove grate. Then remove debris, trash & sediment from catch basin. 6. Loosen solids with spade if necessary. Flush and vacuum catch basin. 7. Inspect structure visually to determine if further cleaning or repair is necessary. Repair to original condition and test operation as appropriate. 8. Dispose of debris at a designated dump site. 9. Remove traffic control devices and move onto next location. 10. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input type="checkbox"/> 1 Vac-Con <input type="checkbox"/> Appropriate Hand Tools <input type="checkbox"/> Backhoe and trailer	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> Water <input type="checkbox"/> Concrete <input type="checkbox"/> Aggregates <input type="checkbox"/> Miscellaneous parts, as required.	20 - 45 per day
<b>NOTES:</b> Structures that cannot be cleaned shall be reported to the street supervisor for initiation of corrective action.	



# **STORM DRAIN UTILITY OPERATIONS AND MAINTENANCE MANUAL PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  35-00	<b>NAME</b>  CLEAN BRIDGE AREA DRAINS	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Clean area drains to remove silt and debris, and to eliminate restriction to flow.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Easements and right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  Plan for all drains to be cleaned twice per year.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input checked="" type="checkbox"/> 1 Equipment Operator <input checked="" type="checkbox"/> 1 Maintenance Worker <input type="checkbox"/> <input checked="" type="checkbox"/> 2 TOTAL	1. A.M. Inspect of equipment, check fuel and oil levels, proceed to work site location. 2. Setup proper traffic control devices. 3. Locate truck in best working position and as far off roadway as possible. 4. Clean out ends of culvert/area drains. 5. Load excess material/debris into truck for disposal at designated dump area. 6. Remove traffic control devices and move onto next location. 7. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input checked="" type="checkbox"/> 1 Dump truck with backhoe <input checked="" type="checkbox"/> Appropriate Hand Tools <input checked="" type="checkbox"/> 1 Vac-Con machine	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input checked="" type="checkbox"/> Water <input type="checkbox"/>	16 per day
<b>NOTES:</b> Inform Supervisor of any non-cleanable culverts of those that can only be partially cleaned. Work should be scheduled, whenever possible, in conjunction with annual cleaning of adjacent structures.	



**STORM DRAIN UTILITY  
OPERATIONS AND MAINTENANCE MANUAL  
PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  40-00	<b>NAME</b>  INSPECT AND CLEAN CULVERTS/STORM DRAIN PIPES	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  The removal of debris of any type from within the facility by the use of the Vac-Con machine; or, by physically entering the facility and manually removing debris to restore full capacity.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Easements and right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  Plan inspection and cleaning of storm drain pipes and culverts every 3-5 years. Specific areas prone to flooding may require annual cleaning. Employees must have been trained and follow confined entry space procedures.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> 1 Working Supervisor <input type="checkbox"/> 1 Equipment Operator <input type="checkbox"/> 2 Maintenance Worker <input type="checkbox"/> 4 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Setup proper traffic control devices. 3. Obtain necessary safety equipment, tools, and materials for that days work.. 4. Remove debris from storm drain system. 5. Load debris and dispose of debris at a designated dump site. 6. Remove traffic control devices and move onto next location. 7. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input type="checkbox"/> 1 Vac-Con machine <input type="checkbox"/> Appropriate Hand Tools <input type="checkbox"/> <input type="checkbox"/>	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> Water <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	linear feet per day
<b>NOTES:</b> Work should be scheduled whenever possible, in conjunction with annual cleaning of adjacent structures.	





## STORM DRAIN UTILITY OPERATIONS AND MAINTENANCE MANUAL PERFORMANCE STANDARD

<b>ACTIVITY NUMBER</b>  45-00	<b>NAME</b>  REPAIR CULVERTS/STORM DRAIN PIPES	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Replacement of deteriorated or failing infrastructure is a capital project. In emergency situations, excavation and repair of storm drain lines is performed to eliminate blockages and repair failed pipes.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Easements and Right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  Consult Engineering and Master Plan for possible required upsizing and design criteria for replacement of permanent storm drain infrastructure. During emergency situations the priority of repairs is: 1. Eliminate blockages and hazards to public safety; 2. Remove flow restrictions and repair damaged/failed pipe sections.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> 1 Working Supervisor <input type="checkbox"/> 1 Equipment Operator <input type="checkbox"/> 2 Maintenance Worker  <input type="checkbox"/> 4 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Setup proper traffic control devices. 3. Take necessary measures to control flow – providing uninterrupted service whenever possible. 4. Cut pavement and /or excavate to the extent required to determine necessary scope of repairs. 5. Remove flow restrictions, as necessary. 6. Back fill and compact in lifts to within 10 inches of surface. 7. Place select material (rock or shell) and compact to within 2 inches of surface (see note below). 8. Request repaving as required. 9. Remove traffic control devices and move onto next location. 10. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input type="checkbox"/> 1 Dump truck with backhoe <input type="checkbox"/> Appropriate Hand Tools <input type="checkbox"/> 1 Pickup <input type="checkbox"/>	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> Pipe & fittings <input type="checkbox"/> Sand <input type="checkbox"/> Cement <input type="checkbox"/> Base rock & asphalt as required	50 linear feet per day
<b>NOTES:</b> Verify location of other utilities prior to excavation. Back fill specifications apply to paved areas. In easements and other unpaved areas,	back fill and compact in 2-foot lifts to grade; re-sod as necessary. Install safety fence and secure job site at end of workday as required.



**STORM DRAIN UTILITY  
OPERATIONS AND MAINTENANCE MANUAL  
PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  50-00	<b>NAME</b>  STREET SWEEPING OPERATIONS	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Street sweep city owned and maintained roadways throughout the community.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  City Limits
<b>PERFORMANCE CRITERIA</b>  Plan to sweep curbed residential, commercial and state contracted routes as indicated in the street sweeping route booklet.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input checked="" type="checkbox"/> 1 Sweeper Operator <input checked="" type="checkbox"/> 1 Maintenance Worker (1/2 time as necessary) <input type="checkbox"/> <input checked="" type="checkbox"/> 1.5 TOTAL	1. A.M. Inspect of equipment, check fuel and oil levels, proceed to work site location. 2. Sweep designated route each day. 3. Transport all debris to designated dump site. 4. End of Shift, return to Corp Yard, wash out, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input checked="" type="checkbox"/> 1 Street Sweeper <input checked="" type="checkbox"/> Appropriate Hand Tools <input type="checkbox"/> <input type="checkbox"/>	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input checked="" type="checkbox"/> Water <input checked="" type="checkbox"/> Gutter Brooms <input type="checkbox"/> <input type="checkbox"/>	30 curb miles per day
<b>NOTES:</b> Inform Supervisor of any roadways not swept and those that can only be partially cleaned.	



## STORM DRAIN UTILITY OPERATIONS AND MAINTENANCE MANUAL PERFORMANCE STANDARD

<b>ACTIVITY NUMBER</b>  55-00 thru 55-07	<b>NAME</b>  MISCELLANEOUS WORK ACTIVITIES	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  All work performed that is not described in any other task identified on the Maintenance Activity List. This includes, but is not limited to, activities such as responding to storm drain and street sweeping inquiries/complaints, providing assistance to other departments /divisions, attending employee training, vehicle/equipment washing; engineering field assistance, etc.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>
<b>PERFORMANCE CRITERIA</b>  When using any of the above noted activity numbers, the work will be measured in labor hours only.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> 1 Working Supervisor <input type="checkbox"/> 1 Equipment Operator <input type="checkbox"/> 1 Sweeper Operator <input type="checkbox"/> 2 Maintenance Workers  <input type="checkbox"/> 5 Total (As needed, will vary depending on task and upon direction of supervisor)	1.
<b>EQUIPMENT</b>	
<input type="checkbox"/> 1 Pickup(s) <input type="checkbox"/> Appropriate Hand Tools and/or equipment as needed	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> <input type="checkbox"/>	<b>Labor Hours</b>
<b>NOTES:</b> Use "55-00" when performing any miscellaneous activity for which there is no specific secondary code. Also, secondary codes should be used with the major code associated with the task when appropriate, e.g., "55-08" to identify material	and number of trips made to dispose of debris collected during the street sweeping process; "30-03" should be used when responding to a citizen complaint regarding a clogged catch basin. Always use the Miscellaneous Activity's work measure unit when documenting work with a secondary code.



**STORM DRAIN UTILITY  
OPERATIONS AND MAINTENANCE MANUAL  
PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  55-08	<b>NAME</b>  MATERIAL DISPOSAL	<b>DATE</b>  7/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Identification of all trips necessary to dispose of trash, debris, sediment, etc., and the total weight of the disposed material in relationship to all storm drain activities.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>
<b>PERFORMANCE CRITERIA</b>  Total trips and amount of disposed material will be quantified daily for each activity.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> N/A <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1. As deemed most cost effective.
<b>EQUIPMENT</b>	
<input type="checkbox"/> N/A <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Number of Trips/Tonnage to complete daily activity.
<b>NOTES:</b>	



**STORM WATER UTILITY  
OPERATIONS AND MAINTENANCE MANUAL  
PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  55-09	<b>NAME</b>  MAINTAIN EROSION CONTROL	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Placement of rip rap, sand bags, or other erosion control materials and repair of damaged areas of erosion protection to restore material to original condition. This work is performed to prevent further deterioration and eliminate potential erosion problems.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Sensitivity, easements and right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  Work is to be established when damage or deterioration is severe enough to present potential erosion problems. Erosion under-cutting roadways, sidewalks, or prepared embankments/improvements shall be repaired immediately. Repair of undermined stabilizers shall be scheduled immediately.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input checked="" type="checkbox"/> 1 Working Supervisor <input checked="" type="checkbox"/> 1 Heavy Equipment Operator <input checked="" type="checkbox"/> 2 Maintenance Workers <input checked="" type="checkbox"/> 4 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Setup proper traffic control devices. 3. Shape work area to receive rip-rap, or other erosion control materials. Place material and grout where applicable. 4. Back fill as necessary. 5. Remove traffic control devices and move onto next location. 6. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input checked="" type="checkbox"/> 1 Pickup <input checked="" type="checkbox"/> 1 Dump Truck and Backhoe <input checked="" type="checkbox"/> Necessary Traffic Control Devices <input checked="" type="checkbox"/> Bull-Dozer only as permitted by Supervisor	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input checked="" type="checkbox"/> 1-50 Tons of Rock for rip-rap (Delivered) <input checked="" type="checkbox"/> 1-12 Yards of ready mix concrete (If needed) <input checked="" type="checkbox"/> Water	Measurement by square feet—production will vary by site.
<b>NOTES:</b>	



**STORM DRAIN UTILITY  
OPERATIONS AND MAINTENANCE MANUAL  
PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  55-10	<b>NAME</b>  VEGETATION CONTROL - MECHANICAL	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  The mechanical removal of brush and weeds to maintain detention, debris basins, and channels free of vegetation.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Easements and Right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  Work to be scheduled when weeds and willows grow up at un-sprayable locations or when growth is too high for effective spraying.		

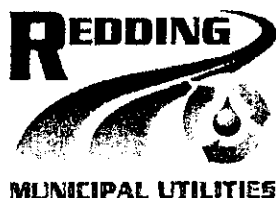
<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> 1 Equipment Operator <input type="checkbox"/> 1 Maintenance Worker <input type="checkbox"/> <input checked="" type="checkbox"/> 2 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Setup proper traffic control devices. 3. Mow or grade channel area as required. 4. Remove traffic control devices and move onto next location. 5. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input checked="" type="checkbox"/> 1 Mower or Grader <input checked="" type="checkbox"/> 1 Tilt Trailer (if needed) <input checked="" type="checkbox"/> 1 Dump or Pickup Truck <input type="checkbox"/>	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Measurement by square feet—production will vary by site.
<b>NOTES:</b>	



**STORM DRAIN UTILITY  
OPERATIONS AND MAINTENANCE MANUAL  
PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  55-11	<b>NAME</b>  VEGETATION CONTROL - CHEMICAL	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  The application of herbicides, to designated areas to prevent new growth and/or control existing vegetation, for the purpose of insuring the capacity and integrity of Storm Drain Facilities.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Easements and right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  Application of pre-emergence herbicide and post-emergence herbicide annually to designated areas combining applications where possible. Chemicals may only be applied by trained and certified employees. Do not apply chemicals near sensitive waterways or streams.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input checked="" type="checkbox"/> 2 Maintenance Workers <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> 2 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Setup proper traffic control devices. 3. Treat channel area as required. 4. Remove traffic control devices and move onto next location. 5. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input checked="" type="checkbox"/> 1 Truck Mounted Spray Rig <input type="checkbox"/> <input type="checkbox"/>	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input checked="" type="checkbox"/> Chemicals <input checked="" type="checkbox"/> Water <input type="checkbox"/>	Measurement by square feet- production will vary by site.
<b>NOTES:</b> Read entire label and following all directions prior to the commence of spraying. An employee must be properly trained before handling / applying herbicides / pesticides.	

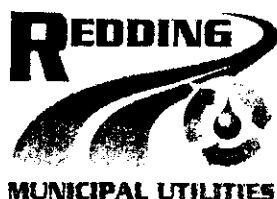


**STORM DRAIN UTILITY  
OPERATIONS AND MAINTENANCE MANUAL  
PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  55-12	<b>NAME</b>  MAINTAIN ACCESS ROADS	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  Mechanical grading of access roads to remove minor ruts and erosion, and restore to original shape and cross slope, for access to facility site.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Easements and right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  As needed prior to rainy season, or when the weather affects the access road condition. Plan to re-profile access roads on a two year frequency.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> 1 Equipment Operator <input type="checkbox"/> 2 Maintenance Worker <input type="checkbox"/> <input checked="" type="checkbox"/> 3 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Setup proper traffic control devices. 3. Restore access road to an acceptable manner, restoring cross sections, filling potholes, grading out ruts. 4. Remove traffic control devices and move onto next location. 5. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input checked="" type="checkbox"/> 1 Grader <input checked="" type="checkbox"/> 1 Roller (if needed) <input checked="" type="checkbox"/> 1 Trailer (if needed) <input type="checkbox"/>	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input checked="" type="checkbox"/> Base Rock <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1/2 mile per day
<b>NOTES:</b>	





**STORM DRAIN UTILITY  
OPERATIONS AND MAINTENANCE MANUAL  
PERFORMANCE STANDARD**

<b>ACTIVITY NUMBER</b>  55-13	<b>NAME</b>  FENCE REPAIRS	<b>DATE</b>  12/01/02
<b>DESCRIPTION &amp; PURPOSE</b>  The repair and/or re-establishment of downed or damaged fences to restore fence to proper condition and to provide right-of-way control.		
<b>AUTHORIZED BY</b>  Supervisor or Working Supervisor		<b>LIMITS ON WORK</b>  Easements and Right-of-ways are still an issue
<b>PERFORMANCE CRITERIA</b>  Repair of downed or open fence areas to be performed upon detection. Repairs to damaged locations that remain partially functional are to be scheduled in priority with other work.		

<b>CREW SIZE</b>	<b>WORK METHOD</b>
<input type="checkbox"/> 2 Maintenance Workers <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 2 TOTAL	1. A.M. Inspect equipment, check fuel and oil levels, proceed to work site location. 2. Setup proper traffic control devices. 3. Perform necessary repairs to fence posts, fabric, top rails, chain link. 4. Remove traffic control devices and move onto next location. 5. End of Shift, return to Corp Yard, fuel up, clean equipment and prepare for next day work.
<b>EQUIPMENT</b>	
<input type="checkbox"/> 1 Pickup <input type="checkbox"/> 1 Dump Truck and Backhoe <input type="checkbox"/> Necessary Traffic Control Devices <input type="checkbox"/> Bull-Dozer only as permitted by Supervisor	
<b>MATERIAL</b>	<b>AVERAGE DAILY PRODUCTION</b>
<input type="checkbox"/> 10 to 50 Linear Feet Fence Fabric <input type="checkbox"/> Miscellaneous Hardware <input type="checkbox"/> Bags of Ready Mix Concrete <input type="checkbox"/>	100 linear feet per day
<b>NOTES:</b>	

# **APPENDIX C**

Channel/Ditch Inventory Maps

**The following map depicts a sample of the information  
that is being developed for inclusion in the Storm Drain Plan.  
A complete set of maps will be on file at the  
Storm Drain Utility Office.**



# **APPENDIX D**

## **Channel/Ditch Maintenance Parameters**

## **STORM DRAIN UTILITY CHANNEL/DITCH MAINTENANCE PROCEDURES**

### **TYPE "A"**

Required maintenance in these ditches is considered sensitive areas. All intended work shall be in accordance and agreement with the Department of Fish and Game and Army Corps of Engineers prior to the commence of any work. Generally, these ditches are considered handwork sites only and any type of machinery is not permissible. Due to the excessive amount of overgrown foliage, staff may require additional assistance from outside agencies, such as California Conservation Corp, which has been trained and are sensitive to watershed related projects. The existing ditch banks are not to be disturbed and all handwork is considered lightly pruning and trimming of dense foliage allowing the conveyance of storm water to flow without interruption. It is in these types of ditches that leaving vegetation in place helps prevent erosion, trap sediment, and filters storm water. Again, care should be taken not to disturb wildlife or aquatic life, including any riparian vegetation which is needed for the wildlife to survive. Removal of debris and unwanted materials will be disposed of properly at a designated site.

### **TYPE "B"**

Required maintenance in these ditches shall only occur at the inlets and outlets portion of the ditch, 15 feet plus/minus upstream and/or downstream. Any piece of equipment utilized for the purpose of excavation and/or clearing debris is only permissible when operations take place from the top portion of the bank. Care should be taken not to disturb wildlife or aquatic life, including any riparian vegetation which is needed for the wildlife to survive. Removal of sediments, debris, and unwanted materials will be disposed of properly at an appropriate designated site.

### **TYPE "C"**

Required maintenance in these ditches shall only occur from the top portion to the bank or from the shoulder portion of the roadway, on either side of the ditch. These particular ditches are commonly referred to as roadside/shoulder ditches. Both convey storm water adjacent to roadways and privately owned properties/businesses. Excavation equipment such as a backhoe or grader from removing unwanted sediment is permissible. Leaving vegetation in selected locations prevents erosion, traps sediment, and filters storm water. Removal of sediments, debris, and unwanted materials will be disposed of properly at an appropriate designated site.

### **TYPE "D"**

Required maintenance in these ditches is to strictly maintain the flow of storm water inside the ditch itself and not allow any amount of storm water to escape. Storm water conveyance in these ditches are to protect the citizens of Redding from flooding. To the best of our knowledge, these ditches do not have any issues pertain to wildlife or aquatic life including any riparian vegetation which is needed to the wildlife to survive. In order to maintain these ditches, silt must be removed occasionally utilizing heavy equipment such as backhoes and bulldozers. Best management practices shall be implemented meaning that all silt removal is to be kept at a minimum. Leaving vegetation in place helps with erosion, filters storm water, and leaves vegetation along the banks of open ditches which helps stabilize the soil and prevent erosion. It is imperative that over-cleaning does not occur in these ditches by staff. Removal sediments, debris, and unwanted materials will be disposed of properly at a designated site.

### **TYPE "E"**

This designation indicates that equipment has not been used in this area due to inability to access the channel/ditch or there has been no need to perform maintenance.

Calaboose Creek

Category	Segment Number	Location From	Location To	Permit Required	Section Type	Width	Length	Depth	Total Square Feet	Ditch Type	Sensitivity	Sensitivity Types	Inspection Frequency	Maintenance Frequency	HAND	TRUCK	BH	CAT	LOADER	SPRAY	MUCKER	CK	CCC	NOTES	
M	150	Sacramento River	E/O Park Marina Drive at Box Culvert	Yes	SC	14	42	6	588	A	H	V, E													
M	151	W/O Park Marina Dr	Double Box Culvert at 2471 Althens Ave	Yes	ED	10	537	6	5370	A	M	V, E	A	3-5 Yrs	X										Remove carts and trash; previously
M	152	W/O ACID	Civic Center Dr	Yes	ED	10.4	800	5	6240	A	M	V, E	A	3-5 Yrs	X									X	Trash removal required 2 - 3 times Per year
M	153	West side of Cypress Street School	Grape St	No	CC	10.4	117	6	1216.8	D	N		A	3-5 Yrs			X								
M	154	West of Grape St Bridge	NE property line of 990 Cypress Ave	No	CC	11.9	592	5	7044.8	D	N		A	3-5 Yrs		X								X	Bobcat
M	155	Hill St E/O Market St	Hill St W/O California St	Yes	ED	8	225	6	1800	A	M	V, E	A	3-5 Yrs					X					X	Spray twice a year, major clearing using
M	156	2222 California St	Gold St	Yes	ED	9.8	993	8	9731.4	A	M	V, E	A	3-5 Yrs										X	
M	157	North side of Gold St	1920 California St	No	CC	10	107	5	1070	D	N		A	3-5 Yrs	X										This may be on private property; not accessible by
M	158	N/O Gold St	South St	Yes	ED	12	171	5	2052	A	M	V, E	A	3-5 Yrs	X										West side of RICH, may be private.
M	159	West side (back) of 1527 Sacramento St	E/O Railroad Tracks	Not in Jurisdiction	ED	7	20	5	140	A	L	V, E	A	3-5 Yrs	X										Back of Gerfinger's Steel
M	160	West side Railroad Tracks Front of 1742 Railroad Ave	Placer Street	Yes	ED	6.3	159	9	1001.7	C	L	V, E	A	B		X									Remove vegetation to keep erosion
M	161	N/E corner of Yuba St at Oregon St	161 feet north on Oregon St	Yes	ED	8	161	5	1288	C	L	V, E	A	A		X									Required to keep clean for Market Fest
M	162	N/E corner of Tehama St at Oregon St	189 feet north on Oregon St	Yes	ED	5	189	8	945	C	L	V, E	A	B		X									Remove vegetation

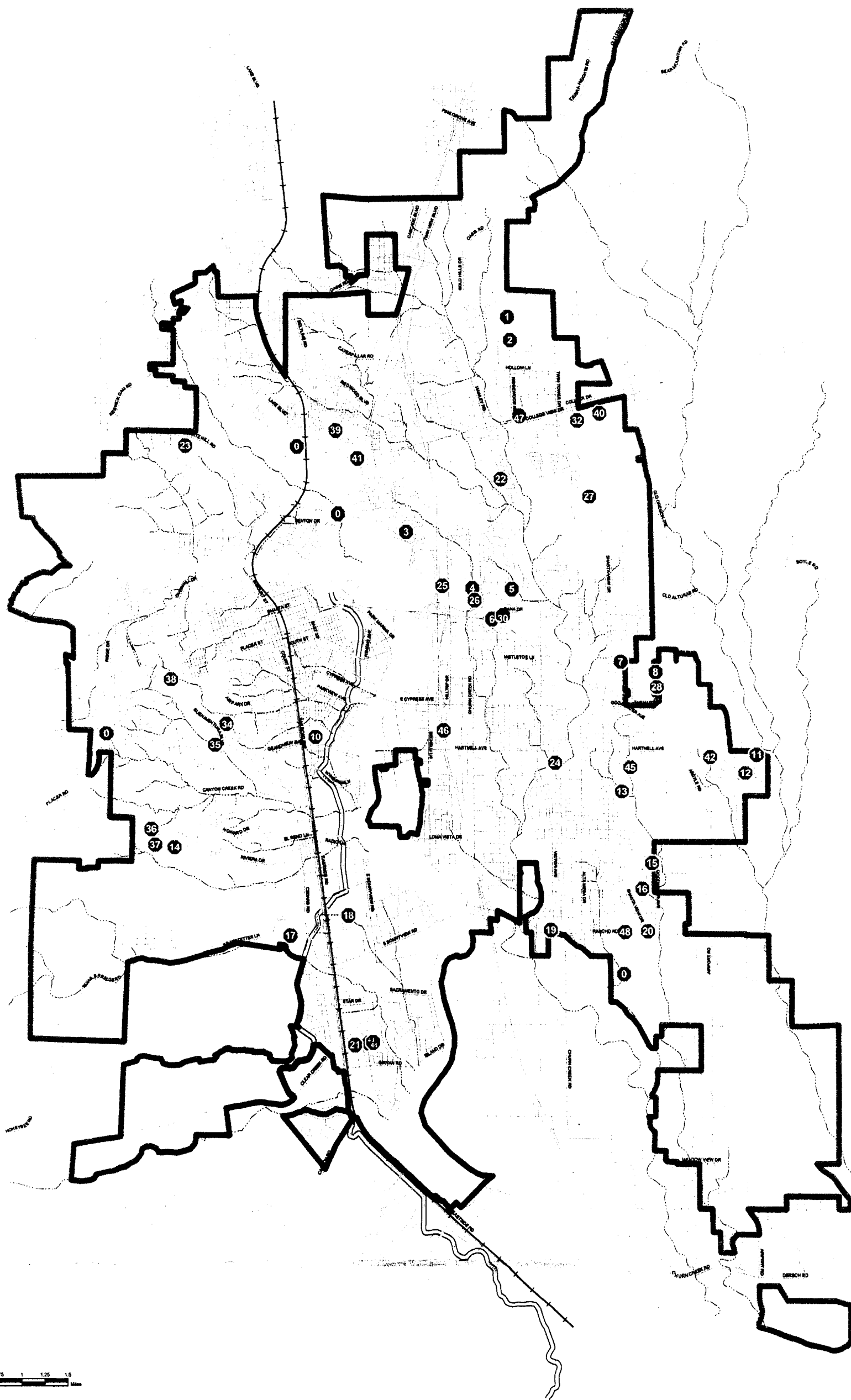
Category	Segment Number	Location From	Location To	Permit Required	Section Type	Width	Length	Depth	Total Square Feet	Ditch Type	Sensitivity	Sensitivity Types	Inspection Frequency	Maintenance Frequency	HAND	TRUCK	BH	CAT	LOADER	SPRAY	MUCKER	CK	CCC	NOTES	
M	163	N/S of Oregon St 189 feet N/O Tehama	Shasta St	No	CC	5	108	8	540	D	N		A	3-5 Yrs	X	X	X								Remove rock, carts and trim trees
M	164	N/E corner of 1333 Chestnut St	87 feet west to Concrete Channel	No	ED	6	87	4	522	C	L	V, E	A	3-5 Yrs	X										Keep pipe face open, down retaining wall is
M	165	West from NW corner of 1333 Chestnut St	End of CC on S/S of 1321 Chestnut St	No	CC	6	171	4	1026	D	N		A	B				X				X			Trim and remove trash
M	166	SAW corner of 1321 Chestnut St	Willis St	Yes	ED	6	378	4	2288	D	L	V, E	A	3-5 Yrs	X								X		No access for backhoe or cat now, must be
M	167	1400 Willis St	1365 Magnolia Ave	Yes	ED	9	417	4	3753	D	L	V, E	A	B		X	X	X							
M	168	1410 Orange Ave	Backside of 1431 Olive Ave	Yes	ED	5	291	5	1455	A	L	V, E	A	3-5 Yrs	X										Very limited work required
M	169	E/S Arch Pipe at back of 1431 Olive Ave	W/S of Concrete Channel	Yes	ED	6	69	5	414	D	L	V, E	A	B	X										
M	170	E/S Open Ditch at back of 1431 Olive Ave	Olive Ave	No	CC	8	87	4	696	D	N		A	3-5 Yrs				X							Lift bobcat over wall; rock removal
M	171	1420 Olive Ave	1445 Almond Ave	Yes	ED	5	753	4	3765	A/E	L	V, E	A	B	X										Lots of trimming needed, would like to use
M	172	W/S of Almond Ave across from 1376	N/E corner of 1441 Pleasant St	Yes	ED	5	1399	4	6995	A/E	L	V, E	A	B	X										Pipe inlet/outlet cleaning only; hard to get to;
M	173	Pleasant St	Backside of 1450 Pleasant St	No	CC	5	135	2	675	D	N		A	B	X							X			
M	174	Between 1450 & 1510 Pleasant St	Backside of 1520 Pleasant St	No	ED	2	93	1	186	C	L	V	A	AN		X	X								Ditch needs clearing now
M	175	NW corner 3002 Placer St	NE corner of Placer St and Oak St	No	ED				0	A/E	N	V, E	A	3-5 Yrs	X										Keep pipe ends open; private yards



Category	Segment Number	Location From	Location To	Permit Required	Section Type	Width	Length	Depth	Total Square Feet	Ditch Type	Sensitivity	Sensitivity Types	Inspection Frequency	Maintenance Frequency	HAND	TRUCK	BH	CAT	LOADER	SPRAY	MUCKER	CK	CCG	NOTES	
S	176	1376 Almond Ave	SW corner of 2700 Placer St	Yes	ED	3	1008	4	3024	A	M	V, E	A	3-5 Yrs	X										Clean pipe at Placer St only concern
S	177	NW portion of 2700 Placer St	S/S of 1640 Highland Ave	Yes	ED	3	909	2	2727	A,E	L	V, E	A	B	X										Clean pipe at Placer St
S	178	Backside of 1778 Highland Dr	N/S of South St	No	ED	3	306	3	918	A	L	V, E	A	3-5 Yrs	X										Clean pipe at Highland Ave opening
S	179	Alley behind 1747 Pleasant St	SW corner of 1807 Pleasant St	No	ED	2	399	1	798	A	N	V	A	A	X	X	X								Remove trash

# **APPENDIX E**

Retention/Detention Inventory and Maps

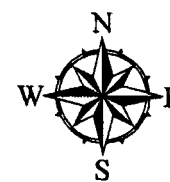


0 0.25 0.5 0.75 1 1.25 1.5 Miles

#### Legend

● Detention Basins

## Location Map Storm Water Detention Facilities



Projection  
NAD-1927  
StatePlane California  
Zone 1

City of Redding GIS Division  
October 2002

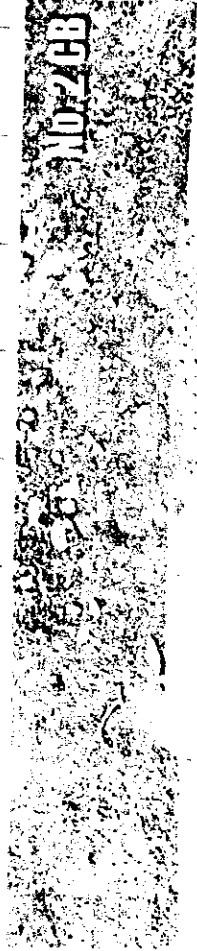
Source: Public Works Data  
Created in ArcGIS 8 using ArcMap



ID	GRID	SUBNAME
1	A10	GOLD HILLS 5
2	B10	EASTRIDGE ESTATES
3	G8	WILLOW PARK APARTMENTS
4	J10	HOME DEPOT
5	J10	LANCER HILLS ESTATES 4
6	K10	CIRCUIT CITY
7	L12	RAVENWOOD ESTATES 17 1
8	L13	CITY OF REDDING CORPORATION YARD
10	N6	AUTOZONE
11	O15	STILLWATER HEIGHTS 1
12	O15	STILLWATER HEIGHTS 1
13	P12	FOREST HOMES 3
14	S4	COUNTRY HEIGHTS 15 2
15	S13	CARRIAGE GLEN ESTATES 5B
16	T13	PACIFIC HEIGHTS 3
17	V6	HELLER LANE
18	V7	BONNYVIEW ESTATES 2
19	V11	CHURN CREEK MEADOWS 1
20	V13	COPPER CREEK 1
21	Y7	EASTSIDE INDUSTRIAL PARK
22		SHASTA HILLS ESTATES 2 1
23		RIVER RIDGE PARK 5
24		SHADOWBROOK APARTMENTS
25		TJ MAX
26		TARGET
27		HACIENDA HEIGHTS 7
28		CITY OF REDDING TRANSFER STATION
29		BEL AIR ESTATES
30		WALMART
32		SIMPSON COLLEGE
34		HOLIDAY MARKET
35		COUNTRY HEIGHTS 16
36		COUNTRY HEIGHTS 15 3
37		COUNTRY HEIGHTS 15 2
38		WEST REDDING PRESCHOOL
39		TREE HOUSE SENIOR APARTMENTS
40		GOLDEN UMBRELLA
41		SHOPCO
42		LUMBERJACK
43		WAVERLY MANOR
44		WAVERLY MANOR
45		FOREST HILLS ESTATES 2
46		KMART
47		OAKDALE HEIGHTS SENIOR LIVING
48		WESTERN ACRES 1

# **APPENDIX F**

Catch Basin/Inlets Inventory



No. 2 CB



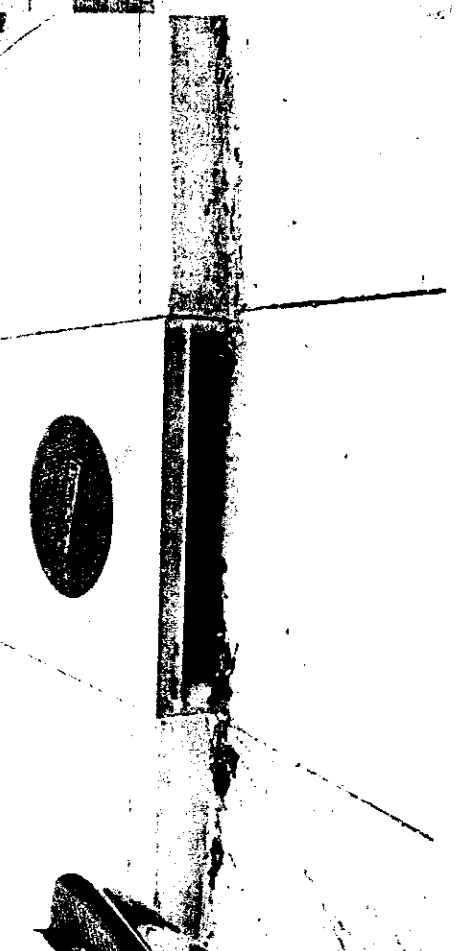
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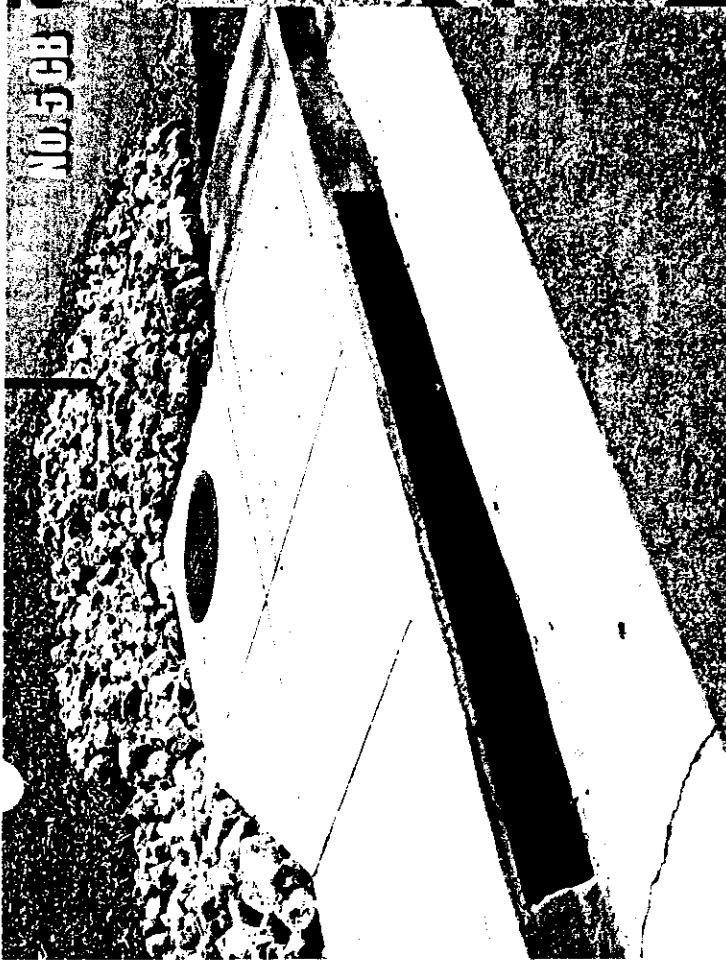


Mounted No. 2 CB

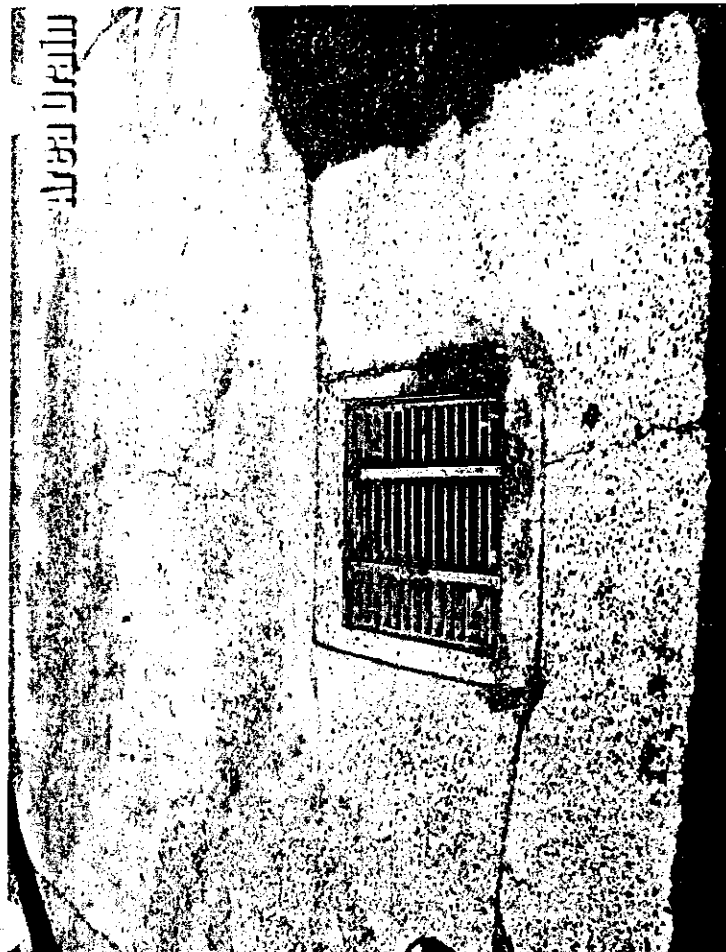


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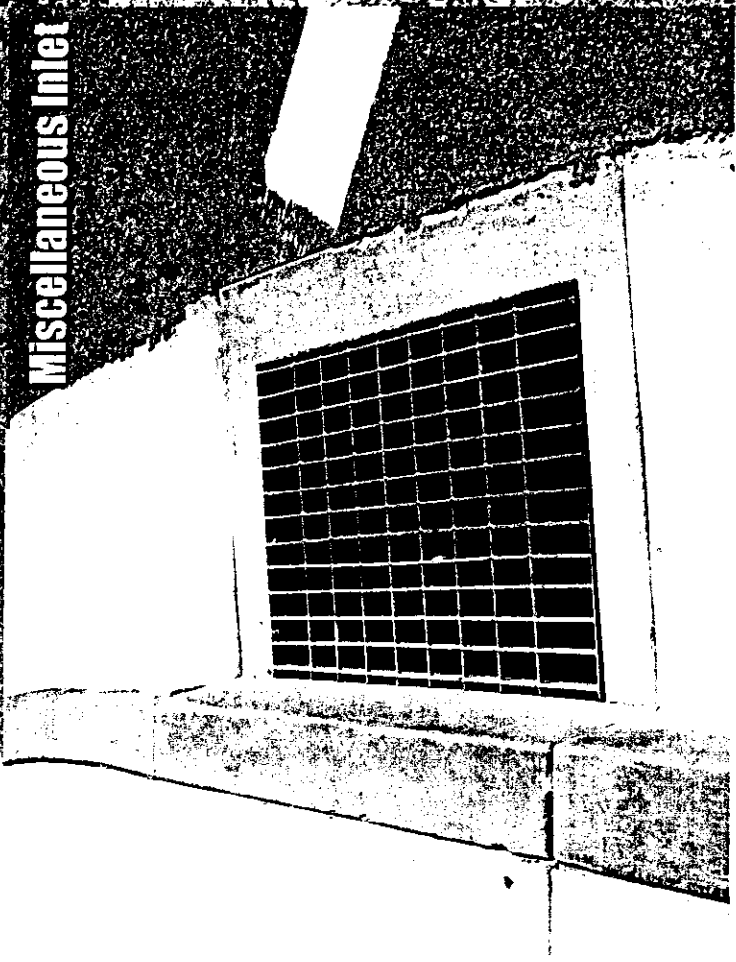




No. 5 CB



Area Drain



Miscellaneous Inlet



Miscellaneous Inlet w/ Teepee

10/10/2002

TYPE	Expr1001
#	1
#1	1
#2	309
#3	2709
#3 BUBBLE OUT	2
#3 MODIFIED	2
#3&#5	1
#4	183
#5	61
10" OPEN INLET	1
24	1
33	6
CB	7
CURB INLET	2
DI	105
DI (CLEANOUT)	1
DI/JUNCTION	1
INLET	2
JUNCTION BOX	82
JUNCTION BOX -	1
JUNCTION BOX /	1
JUNCTION BOX BU	1
JUNCTION BOX RO	1
MD/AD	1
MH	2
MISC DRAIN	66
MISC DRAIN CURB	1
MISC INLET	1
MOD #3	1
MOD#3	1
MODIFIED #3	1
TEMP DI	1
UNDERSIDEWALK	1



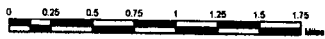
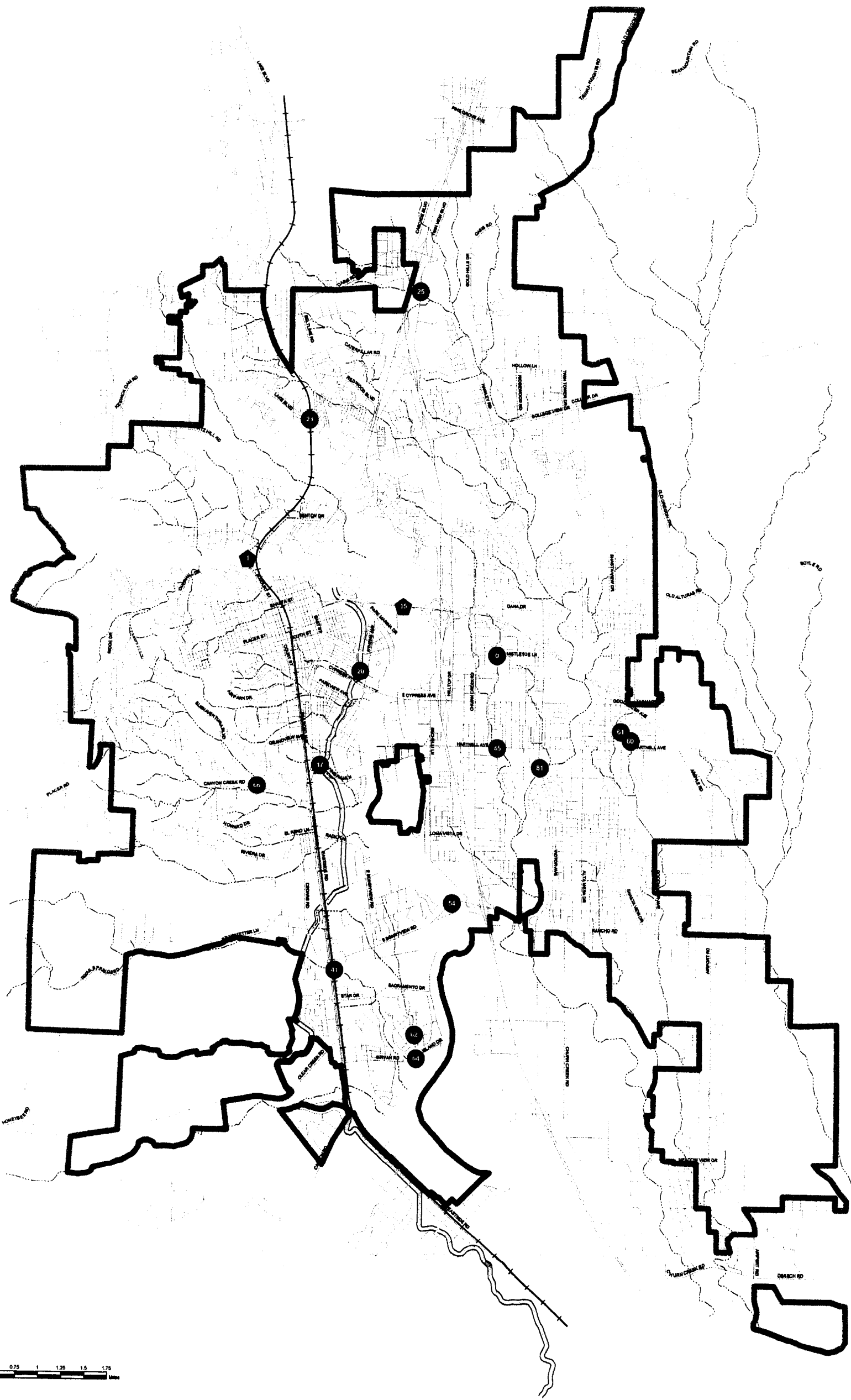
# **APPENDIX G**

Bridge Area Drain Inventory and Map



## BRIDGE AREA DRAIN INVENTORY

City Bridge Number	State Bridge Number	Street Name	Crossing	Number of Area Drains
1	6C-001	Benton Drive (Diestelhorst)	Sacramento River	8
15	6C-108	Cypress Avenue	Sacramento River	32
17	6C-162	Wyndham Lane	ACID Canal	6
20	6C-047	Locust Street	ACID Canal	1
23	6C-033	Lake Blvd	SPRR	4
25	6C-058	Twin View Blvd	Churn Creek	16
41	C-335	Eastside Road	Olney Creek	1
45	6C-140	Lawrence Road	Hartnell Avenue	1
54	6C-136	South Bonnyview Road	Sacramento River	7
60	N/A	Hawn Avenue	Between Bonset Street & Oakview Drive	2
61	N/A	Wilson Avenue	Between Shasta View Drive and Oakview Drive	2
62	N/A	Lakewood Drive	West of Reflection Avenue	2
64	N/A	Island Drive	West of Riverside Drive	1
66	N/A	Canyon Creek Road	1570 Canyon Creek Road	1
81	N/A	Victor Avenue	South of Hartnell Avenue	6
N/A	N/A	Mistletoe Lane	East side of Mistletoe School	4

Sep-02




**Legend**

-  Maintained
-  Not Maintained

# *Location Map* *Bridge Drain Inventory*



Projection  
NAD-1927  
StatePlane California  
Zone 1

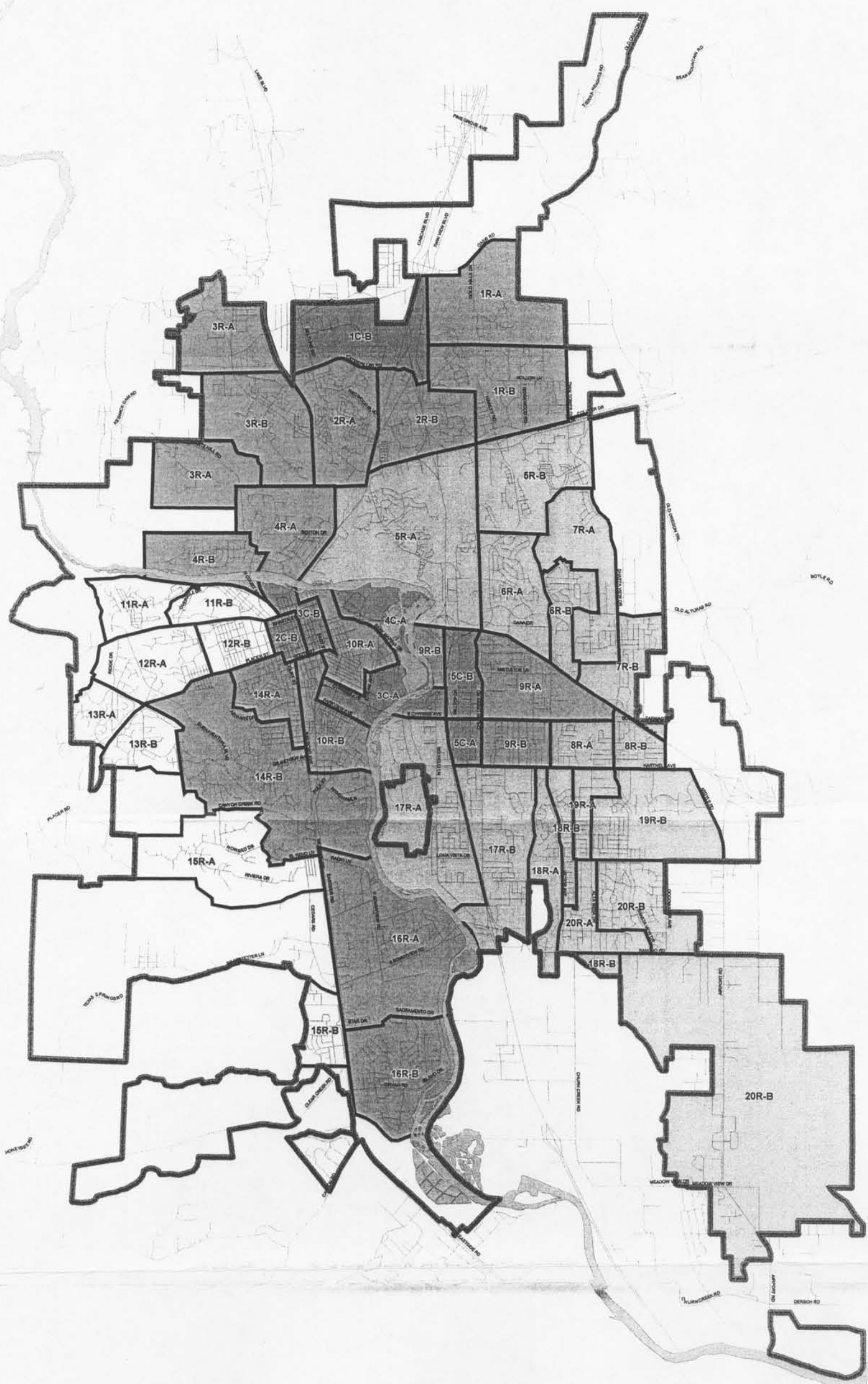


City of Redding GIS Division  
October 2002

Source: Public Works Data  
Created in ArcGIS 8 using ArcMap

# **APPENDIX H**

Street Sweeping Route Index and Map



**Legend**

**DAY**

- Commercial
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday

# ***Location Map*** ***Street Sweeping Zones***



Projection  
NAD-1927  
StatePlane California  
Zone 1

City of Redding GIS Division  
October 2002

Source: Public Works Data  
Created in ArcGIS 8 using ArcMap



# STREET SWEEPING DATES BY ROUTE

5C-A con't	5R-B con't	10R-A	13R-B con't	17R-B
6/3/2003	11/10/2003	2/19/2003	9/16/2003	1/10/2003
6/17/2003	6R-A	4/16/2003	11/11/2003	3/7/2003
7/1/2003	1/20/2003	6/11/2003	14R-A	5/2/2003
7/15/2003	3/24/2003	8/6/2003	1/8/2003	6/27/2003
7/29/2003	5/19/2003	10/1/2003	3/5/2003	8/29/2003
8/12/2003	7/21/2003	11/26/2003	4/30/2003	10/24/2003
8/26/2003	9/22/2003	10R-B	6/25/2003	12/26/2003
9/9/2003	11/17/2003	2/26/2003	8/20/2003	18R-A
9/23/2003	6R-B	4/23/2003	10/15/2003	1/17/2003
10/7/2003	1/27/2003	6/18/2003	12/10/2003	3/14/2003
10/21/2003	3/31/2003	8/13/2003	14R-B	5/9/2003
11/4/2003	6/2/2003	10/8/2003	1/15/2003	7/11/2003
11/18/2003	7/28/2003	12/3/2003	3/12/2003	9/5/2003
12/2/2003	9/29/2003	11R-A	5/7/2003	10/31/2003
12/16/2003	11/24/2003	2/25/2003	7/2/2003	18R-B
12/30/2003	7R-A	4/22/2003	8/27/2003	1/24/2003
5C-B	2/3/2003	6/17/2003	10/22/2003	3/21/2003
1/7/2003	4/7/2003	8/12/2003	12/17/2003	5/16/2003
1/21/2003	6/9/2003	10/7/2003	15R-A	7/18/2003
2/4/2003	8/4/2003	12/2/2003	1/22/2003	9/12/2003
2/18/2003	10/6/2003	11R-B	3/19/2003	11/7/2003
3/4/2003	12/1/2003	1/7/2003	5/14/2003	19R-A
3/18/2003	7R-B	3/4/2003	7/9/2003	1/31/2003
4/1/2003	2/10/2003	4/29/2003	9/3/2003	3/28/2003
4/15/2003	4/14/2003	6/24/2003	10/29/2003	5/23/2003
4/29/2003	6/16/2003	8/19/2003	12/24/2003	7/25/2003
5/13/2003	8/11/2003	10/14/2003	15R-B	9/19/2003
5/27/2003	10/13/2003	12/9/2003	1/29/2003	11/14/2003
6/10/2003	12/8/2003	12R-A	3/26/2003	19R-B
6/24/2003	8R-A	1/14/2003	5/21/2003	2/7/2003
7/8/2003	2/24/2003	3/11/2003	7/16/2003	4/4/2003
7/22/2003	4/21/2003	5/6/2003	9/10/2003	5/30/2003
8/5/2003	6/23/2003	7/1/2003	11/5/2003	8/1/2003
8/19/2003	8/18/2003	8/26/2003	12/31/2003	9/26/2003
9/2/2003	10/20/2003	10/21/2003	16R-A	11/21/2003
9/16/2003	12/15/2003	12/16/2003	2/5/2003	20R-A
9/30/2003	8R-B	12R-B	4/2/2003	2/14/2003
10/14/2003	3/3/2003	1/21/2003	5/28/2003	4/11/2003
10/28/2003	4/28/2003	3/18/2003	7/23/2003	6/6/2003
11/11/2003	6/30/2003	5/13/2003	9/17/2003	8/8/2003
11/25/2003	8/25/2003	7/8/2003	11/12/2003	10/3/2003
12/9/2003	10/27/2003	9/2/2003	16R-B	12/5/2003
12/23/2003	12/22/2003	10/28/2003	2/12/2003	20R-B
5R-A	9R-A	12/23/2003	4/9/2003	2/21/2003
1/6/2003	2/11/2003	13R-A	6/4/2003	4/18/2003
3/10/2003	4/8/2003	1/28/2003	7/30/2003	6/13/2003
5/5/2003	6/3/2003	3/25/2003	9/24/2003	8/15/2003
7/7/2003	7/29/2003	5/20/2003	11/19/2003	10/10/2003
9/8/2003	9/23/2003	7/15/2003	17R-A	12/12/2003
11/3/2003	11/18/2003	9/9/2003	1/3/2003	
12/29/2003	9R-B	11/4/2003	2/28/2003	
5R-B	2/18/2003	12/30/2003	4/25/2003	
1/13/2003	4/15/2003	13R-B	6/20/2003	
3/17/2003	6/10/2003	2/4/2003	8/22/2003	
5/12/2003	8/5/2003	4/1/2003	10/17/2003	
7/14/2003	9/30/2003	5/27/2003	12/19/2003	
9/15/2003	11/25/2003	7/22/2003		

# APPENDIX I

## Vehicle and Equipment Inventory

# **STORM DRAIN UTILITY VEHICLE AND EQUIPMENT INVENTORY**

## **DIVISION 801**

Vehicle Number	Type of Vehicle	License Number
217	2002 Ford F-150 4x4	1084827

## **DIVISION 802**

Vehicle Number	Type of Vehicle	License Number
268	2000 JCB Backhoe	1018888
271	1973 Loard Mucker	N/A
273	2002 International Truck 10 yard	1128022
274	1994 International Trailer	917089
275	1999 Ford F-450 Truck	1020646
277	1994 Ford Vac-Con	4855
278	1998 Vermeer Chipper	1005267
279	200 Gallon Weed Sprayer	301347
280	Confined Space Trailer	322607
286	1994 Welding Trailer	101883
N 780	1989 Lincoln Welder	N/A
N 977	1980 Universal Heater	N/A
N1 449	2001 Wacker Tamper	N/A
N1 852	2002 HusQvarn	N/A
N1 854	2000 Stihl	N/A
N1 855	2000 Stihl Chain Pole Saw	N/A
N1 865	1999 Stihl Chain Saw	N/A
N1 866	1990 Stihl Chain Saw	N/A
N1 868	1997 Husqvarna	N/A
N1 869	1998 Husqvarna	N/A
N1 870	1998 Husqvarna	N/A
N1 952	1996 Wacker Tamper	N/A
1449	2" Trash Pump by Wacker	N/A
1856	Husqvarna Back Pack Blower	N/A
1854	Stihl Chain Saw	N/A
1860	Wacker 5.6 Generator	N/A

## **DIVISION 803**

Vehicle Number	Type of Vehicle	License Number
233	Ford Swartz Sweeper	1020142
234	Ford Swartz Sweeper	1020143

7/15/2002